FOUNDED, 1904

The Far Eastern Review

ENGINEERING + FINANCE + COMMERCE

THE PIONEER IN ITS FIELD

A Monthly Review of Far Eastern Trade, Finance and Engineering, Dedicated to the Industrial Development and Advancement of Trade in Far Eastern Countries.

HEAD OFFICE: 5 JINKEE ROAD - - - - SHANGHAI, CHINA.

George Bronson Rea, *Editor and Publisher*

William Carter Rea, *Advertising Manager*

JAPAN OFFICE: H. C. Huggins, Representative, No. 12 Takagi-cho, Akasaka-ku, Tokyo.

NEW YORK: British and Colonial Press, Inc., 738 The Knickerbocker Building, Broadway and 42nd Street.

MANILA OFFICE: Fleming, Percy Smith and Seth, Roxas Building, Escolta.

BERLIN: Rudolf Mosse, 46-49 Jerusalemer Strasse.

GREAT BRITAIN: Walter Judd, Ltd., 81-87 Gresham Street Bank, London, E.C.

SAN FRANCISCO: Leroy P. Boyce, Monadnock Building

SUBSCRIPTION IN CHINA: $10.00 Mexican, U. S. & Philippines Gold $5.00, Elsewhere $12.00 Mexican per annum

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Entered at the U.S. Postal Agency, Shanghai, China, as second-class matter. Registered at the Chinese Post Office as a Newspaper. Entered at the Japanese Post Office as a Newspaper.

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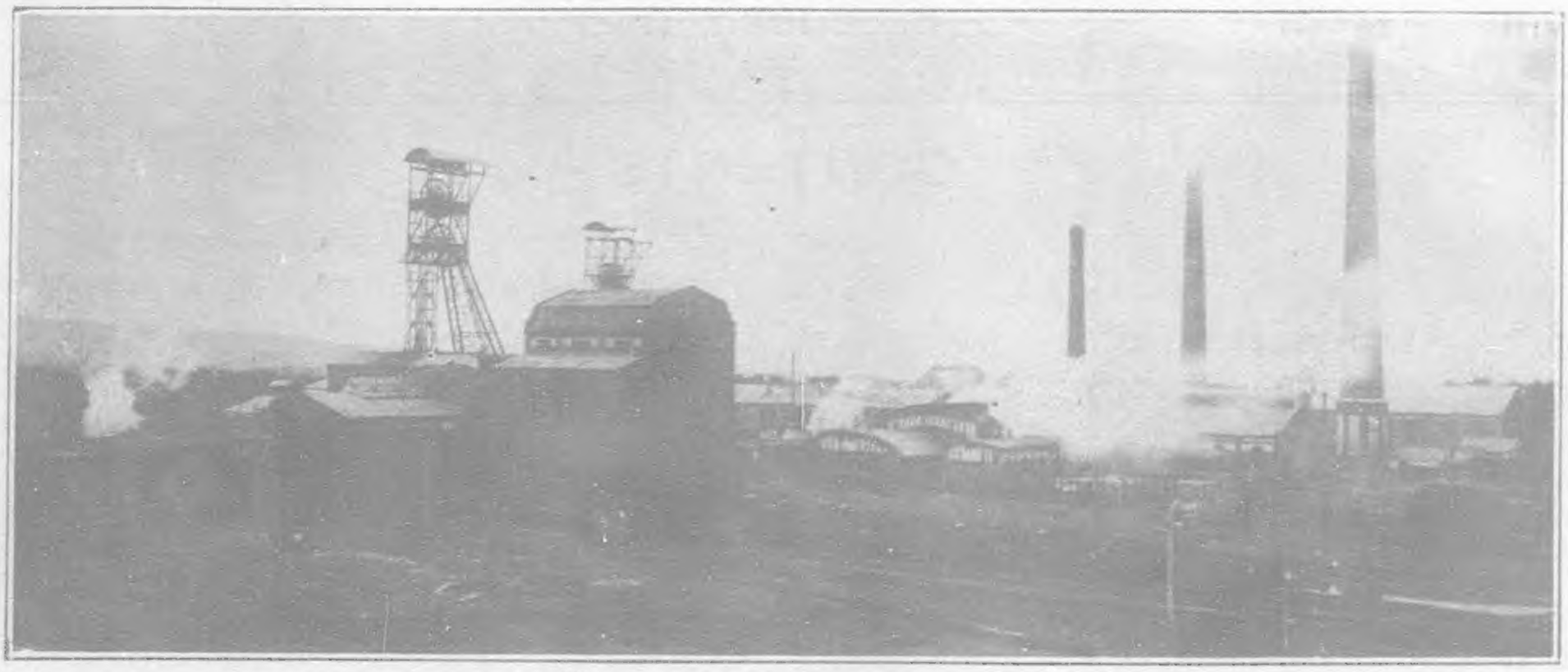
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YALE UNIVERSITY
FEB 27 1923

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

上海仁記路第五號

遠東時報

FACING THE FACTS

ELECTRICAL DEVELOPMENT IN JAPAN

YANGTZE RIVER BRIDGE

LAND OF THE ROKO

INDO-CHINA

OIL FIELDS OF THE N. E. I.

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SHANGHAI, PEKING, TOKYO AND MANILA

J10
F22

Some Outstanding Features of the Walworth Complete Line for Oil Fields and Refineries

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FIG. W2621
IRON BODY GATE VALVE



FIG. W4104



FIG. W1323
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FIG. W3782
IRON COCK

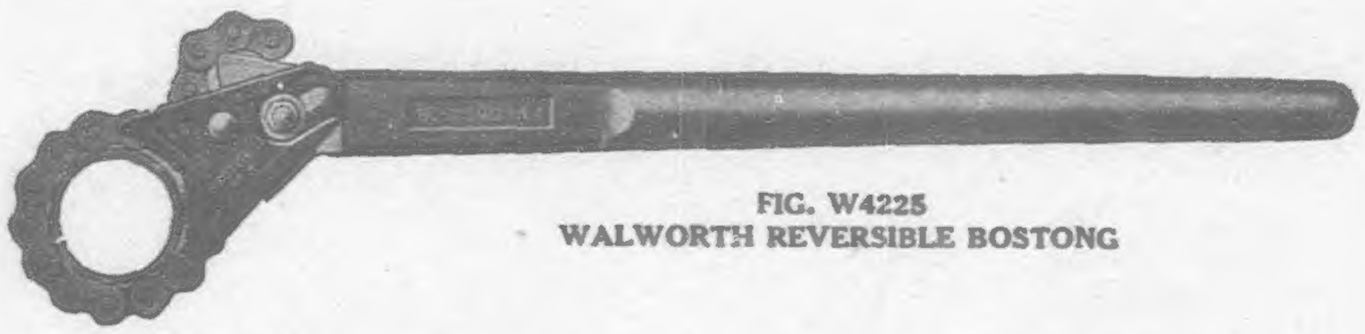


FIG. W4225
WALWORTH REVERSIBLE BOSTONG



FIG. W2351
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The Far Eastern Review

ENGINEERING FINANCE COMMERCE

VOL. XVIII SHANGHAI, DECEMBER, 1922 No. 12

FACING THE FACTS

From the September Issue of THE FAR EASTERN REVIEW

"If we wait another ten months or a year for the parliament to draft a constitution and Wu Pei-fu to settle his score with Chang Tso-lin, the control of China will have passed out of the hands of the *tuchuns* into those of the bandit chiefs. As the mandarins gave way to the militarists, the latter will give way to the bandit leaders. Over 40,000 so-called bandits are ravaging the province of Shensi, while the provinces of Honan, Anhuei and Shantung are overrun with these gentry, to say nothing of the chronic situation in Manchuria, where the Hunghutzes defy Chang Tso-lin to suppress them. In fact, nearly every province is overrun with these bands praying upon the helpless people. Towns are burnt and sacked, women torn from their homes, and men pressed into the service of the bands. Foreigners are siezed and held for ransom, and even the son of the redoubtable Christian General Feng was kidnapped from under his father's protecting wing on a recent trip to Kueiteh. The situation in Manchuria goes from bad to worse. Within the past few months several attempts have been made to interfere with the South Manchuria Railway, and recently the rail fastenings were loosened and the express wrecked. There is a limit to such practices. The forces of Wu Pei-fu, Chang Tso-lin and other military chieftains are helpless before the bandit rule. Any serious attempt to eradicate these bands only result in their augmentation by the desertion of the uniformed troops sent to suppress them. This is ANARCHY. This is CHINA. The foreign powers can prolong the situation and make matters worse by financing any one faction, they can advance sums to Peking in order that parliament, the "salary demanders union" and hordes of officials can be sure of their pay for ten months more, but at the present rate of progress, when that time expires, the white wolves of China will rule the country. The foreigner will again be asked to furnish the funds to restore order. A vicious circle. Stop it now."

THE "White Wolves" of China are slowly but surely overthrowing the last vestige of organized government and taking over control of the country. An orgy of rape, murder and destruction is now taking place in Central China. Cities, towns, villages and hamlets are looted, burned and razed to the ground; the fairest women carried off to slake the lust of the brigands. Merchants and officials are abducted and held for ransom. Foreigners are no longer exempt from capture and death, and as each crime goes unpunished the operations of the bandits become bolder and bolder, until now there is no security for life, liberty, honor or property for the foreigner who resides or travels through the provinces of Honan, Hunan, Anhwei and adjacent districts.

Where will it end? The legations in Peking seem powerless to find or suggest a solution. The policy of non-interference in the internal affairs of other countries is being scrupulously adhered to, and while the subjects of all nations cry out for protection their voices are drowned in the welter of sentimental propaganda which floods the newspapers of Europe and America. The Peking government is admittedly powerless to enforce law and order. Government has ceased to exist. Only the Waichiaopu and the loan-seeking officials of the ministry of finance provide evidence of any semblance of government in Peking. They are very active, so active in fact, that their activities overshadow the real events transpiring in the provinces.

The puppet show in Peking is unable to provide protection to life and property, in fact, it cannot even guarantee its own salaries. The masses of China are impotent before the hordes of militarists whose rabble armies are eating up their sustenance. The militarists in turn are now powerless before the increasing activities of the numerous bandit hordes, composed in large part of their own unpaid soldiers. As it is in Honan, right under the nose of General Wu Pei-fu, so it is in Hunan, in Anhwei, in Fukien, in Kwantung, in Kwangsi, in Szechuan, in Shensi, in Shantung and in the Three Eastern Provinces known as Manchuria.

For some years past, the apologists for crime and outlawry in Manchuria, Shantung and other parts of China, have succeeded in convincing the outside world that Japan was at the bottom of these disturbances. *There are no Japanese adventurers in Honan, Anhwei, Hunan or Szechuan.* There may be some in Manchuria, but banditry has been endemic in that section of China for a century

or more. Long before the Japanese set foot in Manchuria, it was an outlaw's paradise. The evidence of every traveler who explored the province before it was opened to trade corroborates this statement. When James and Younghusband traveled through the province in 1885 the bandits were as active as they are now, and ten years later when Hosie passed through on an official mission, his party was attacked. Hosie is authority for the statement that about a thousand bandits were beheaded yearly at the provincial capital of Kirin. *All this before the Japanese came into Manchuria.*

It has been the same in all other remote provinces of China. The home of piracy for centuries has been the China coast and the Canton delta, while the frontiers of Indo-China have provided hair-raising episodes that put in the shade all the diabolical deeds of outlawry in other countries.

The reports of the commissioners of customs for the Kwangsi and Kwangtung districts read more like 17th century tales of Captain Kidd than the prosaic recording of trade movements. When the bandit hordes in Manchuria and Shantung swoop down upon and loot and destroy towns and villages, there are always apologists to be found who hasten to ascribe their depredations to the machinations of the Japanese, but when the same gentry in Kwangsi, capture a French soldier, tie him to a table and skin him alive, the episode is passed over and forgotten. The truth must be faced that brigandage and outlawry in certain sections of China are endemic, the natural sequence to the failure of the authorities to enforce respect for the law. Now that government has ceased to exist in China, it is not at all surprising that the activities of these desperadoes are becoming bolder, and that for all practical purposes they are now the real rulers of the land. At the rate lawlessness is spreading in China, it will not be long before foreign settlements will be unsafe to live in, and unless measures are immediately adopted to insure protection, another six months will chronicle events that will call for international intervention.

The picture is not overdrawn, if anything it minimizes the situation. At various times when the Japanese government protested against the bandit activities in Manchuria and along the Korean border line, the foreign community in China has withheld sympathetic support, and when Japan, taking the law in her own hands, has despatched her troops into the disturbed districts, the howl of indignant protests re-echoed around the world. The shoe is now on the other foot. The orgy of rape, murder and destruction in Central China has at last provoked a forceful protest from the foreign residents of Hankow and the powers asked to intervene. This comes after a year of silent acquiesence on the part of the powers to the depredations of the bandits and military in the upper Yangtze and Central China districts. Travel on the Yangtze has been unsafe for over a year. Peaceful steamers with their freight of passengers have been fired upon; held up, robbed and otherwise interfered with. Now foreigners are dragged about the country as captives to the bandit hordes and placed on the firing line to ward off pursuit.

Space alone prevents us from reproducing in full the harrowing tales embraced in the speeches of protest against the bandit outrages at the meeting of the international chamber of commerce of Hankow held on November 15. This time the evidence comes largely from the missionaries, and it is to be hoped that their influence in Washington and London will compel that attention to the situation which could not be attained by commercial protests. In the words of the *Shanghai Times*, "*in any review of the brigand situation in Honan, brief though it be, it is impossible to enter into details and tell about the scores of bands which have been terrorizing nearly all parts of the province, devastating the country, burning and looting villages, market towns and even some cities, extorting money by torture, raping women and holding men and women for ransom. The details of this story would fill volumes. These bands are roving about the country, looting city after city, interfering with the flow of foreign trade, robbing mission stations, carrying off French, British and American nationals, among them even little children, dragging them from place to place, and even placing them upon the firing line, when as sometimes happens, there is an engagement between brigands and soldiers. One's blood boils on reading the terrible record of devastated territory, shameful indignities, burning towns and ravished women. And in face of all this, the authorities remain singularly apathetic and occasionally, prodded by diplomatic protests, are moved to send mild remonstrances to the tuchun of the province concerned.*"

Under the title of "Disorder in China, a Description of Conditions in some of the Chief Trading Areas of China," the November number of the British Chamber of Commerce *Journal* also places the facts before the reader.

It shows that, instead of the chief trading areas in China offering the rosiest prospects to the business man, they are really the happy hunting grounds of native robbers into which, if he ventures, he is more likely so lose what he has than to gain anything. The writer begins in the North and takes up the trading areas province by province. Of Manchuria he says: "Traveling has become unsafe off the principal main roads throughout the whole province. Many towns in the interior, which in previous years have been annually visited by the foreign travelers of the oil and tobacco firms, have been out of bounds this year." "In the Kirin province brigandage has been very bad, and little or nothing has been done by the provincial authorities to cope with it. Wulichieh, a very wealthy village only 20 miles from Kirin city, was attacked in the middle of September by a band who thoroughly looted the place killing in the process a large number of the inhabitants. This was only one of many similar outrages." Of Shantung it is said: "The Chiaotung circuit is still unsafe to travel and likely to remain so." In Shensi the story is: "Brigandage appears to be rife throughout the whole province, especially in the western districts. So many people have been kidnapped and held for ransom that the governor has sent his own family to Taiyuanfu in Shansi for safety." The story of Honan is given, but of that we have had more than enough of late. From Chungking the report comes that: "As a result of the recent military operations, brigandage has seriously increased. Towns and villages have been attacked and weathy residents held to ransom. Parts of the southeastern district are said to be practically depopulated, the rural population having sought refuge in the towns." From Chengtu the news is: "Brigandage is as rampant as ever. In parts of the province gangs of starving people have been raiding the houses of the rich. Cain Lung Chang, a small village only two miles outside the north gate of Chengtu, was completely cleaned out house by house."

In commenting on the above, the *Central China Post*, one of the best informed authorities on conditions in the interior, says "the above investigation was apparently not extended to such provinces as Hunan, Kiangsi, Fukien, Kwantung and Kwangsi, or the picture would have been blacker still. Such is China in the present year of grace: will the Home press please take note. It is indeed very wearisome, and rather annoying, to find China so frequently set up as an object of admiration that it is hard to have patience with it."

Unchecked lawlessness can have only one result. When cities within a few hours march of the headquarters of the redoubtable General Wu Pei-fu are sacked and ravished and no effort is made to round up the culprits, and when life is placed in jeopardy once the foreigner steps outside the Japanese railway zone in Manchuria and comes under the jurisdiction of the equally redoubtable Marshal Chang Tso-lin, and when travel becomes unsafe for foreigners in all other parts of China, we are rapidly approaching the time, when conscious of their immunity from chastisement, the Real Rulers of China, will extend the scope of their operations to the more opulent treaty ports.

I. MANCHURIA

The Powder Magazine

By Geo. Bronson Rea

"Kemal Pasha overthrew the treaty of Sevres and defied the allies in Europe. It may be that Japan, to protect her vital interests, will be compelled to follow his example, in order to preserve the integrity of China and the peace of the Far East."

ENCOURAGED and supported by the Soviet and Germany, Kemal Pasha brought Europe face to face with the horrors of another upheaval in the Balkans. The firm stand of Great Britain alone checked the onward march of the victorious Turks and thwarted for the time being the designs of Moscow. The Turkish victory was hailed throughout Asia as a sign that Asiatics may yet come into their own through the dissentions of Europe. Checked for the moment in the Near East and true to traditional Muscovite tactics, the Soviet shifted the scene of operations to the next weakest point in Great Britain's armor, and is now creating a situation in Eastern Asia rapidly developing to the point where Japan will be called upon to take some decisive step in order to protect her vital interests against the progressive advance of Bolchevism into regions where their presence and influence can only result in complicating an already complex situation and precipitating a crisis. We cannot apply one principle in Europe and America for the protection of fundamental policies and deny the right of a strong power in Asia to apply the same principles where its very existence is at stake. If the British are upheld by world opinion in such firm measures for the defense of a basic strategic policy. and the United States is justified in applying the Monroe Doctrine, then the time is past when the world may condemn Japan for applying similar measures for the defense of her national existence,

Forced by the pressure of world opinion and united diplomatic action to recede step by step from advantageous strategic positions in Eastern Asia, until she can do so no further with dignity or safety, will military Japan emulate the example of Kemal Pasha? Or, if this comparison be distasteful, will a liberal Japanese cabinet follow the lead of its British counterpart and break the understandings which fetter its independent action in defending the existence of the empire? Will the consortium powers who have so emphatically laid down the fundamental law in regard to China's integrity, unite in support of the principles they established? Will they uphold the integrity of China? Will they send their troops into Manchuria to give effect to the doctrine that Mongolia is an integral and most important province of the republic of China? Will they demand in the name of world peace that China immediately put her house in order and comply with her international obligations by driving the Russians out of Mongolia, or, will they wait until Japan, like England, is compelled by the stern realities of the situation to adopt measures for the defense of policies which are as dear to her, if not dearer, than those which the world applauds when appealed to by Great Britain as justification for her recent stand at Constantinople, and those which every American, no matter what his creed, will fight at the drop of the hat to maintain?

Living up faithfully to her promises and pledges, Japan has returned Shantung to China, evacuated Siberia, withdrawn her forces from Hankow and northern Manchuria and reduced her garrisons in the southern part of the same province. She has fulfilled her agreement with the United States to clear out of Russian territory. Her government now faces the world with a clear conscience. The slate is wiped clean.

In the consortium negotiations which followed the Paris conference, certain very important principles were established. These negotiations centered upon the inclusion or exclusion of the Taonan-Jehol line into the international pool. Never perhaps in the history of diplomacy was such disregard given to the strategic policies of an ally by powers who would have fought to a finish before sacrificing similar doctrines evolved for their own defense. Never, perhaps, in the history of diplomacy has a friendly nation been so hard pushed as to be compelled to forsake the usages of diplomacy and explain her policies in language that left nothing the imagination. Japan's diplomats were finally forced to tell her allies that her claims to the Taonan-Jehol line were based primarily on strategic reasons for the mutual defense of China and Japan against "the menace from the direction of Urga." The powers, who have a very long memory where their own vital policies are concerned, were attacked with aphasia when asked to consider Japan's position. They forgot that the Taonan-Jehol railway rights were secured from China in 1912, immediately after Russia had taken over Mongolia and was moving heaven and earth to raise the loans in Paris to build the strategic railways that would enable her armies to attack Japan on her unprotected flank. The powers ignored the history of those terrible years following the peace of Portsmouth, when Japan was compelled to add to her staggering burden of taxation in order to arm and equip new battalions and keep abreast of Russia's gigantic plans and secret manœuvres to renew the conflict. This, Witte assures us, was to have occurred in 1912.

Japan's position in Eastern Asia differed in no wise from that of her allies in Europe, who forced through a difficult peace and broke up the German, Austrian, Russian and Turkish empires in order to create buffer states to guarantee them from the possible revenge of a vindictive enemy. These same powers, after carefully protecting themselves for the next quarter century, rejected the claims of Japan to erect similar defenses against the possible comeback of her traditional enemy. Principles that applied in Europe did not apply in Asia. The American and British press pooh poohed the idea of a reorganized Russia, when Japan put forward her reasons for maintaining certain policies in Eastern Asia. The same diplomats who calmly carved European Russia into new states for their own purposes, took over the self-imposed task of defending her integrity in Asia in order to check Japan. Japan could not be permitted to retain her rights to a strategic railway that would defend her from attack through Mongolia. After receiving assur-

ances, however, that her vital interests would never be placed in jeopardy through the activities of the consortium, Japan swallowed her disappointment and accepted the verdict which condemned her at no distant date to again stake her independence on the outcome of a trial of strength on the plains of Manchuria.

The concerted pressure of the powers upon Japan to compel her to relinquish the rights to a railway which constituted her first line of defense, will stand as one of the greatest in consistencies of recent history, the misguided move that is bound to bring its own reward. The very statesman, who as viceroy of India, declared that "the recognition by any power of Russia's right to a port on the Persian Gulf would be regarded as a deliberate insult to Great Britain, an intentional provocation to war," as secretary of state for foreign affairs in 1920, was the first to deny to Japan to right to apply a similar policy in Eastern Asia when the latter's national existence was placed in jeopardy through the forward moves of Russia. The American president who declined to permit the Monroe doctrine to be vitiated by the league of nations, rejected Japan's rights to maintain a policy calculated to ward off the attack of her most formidable enemy. It was a wonderful victory for western diplomacy. It is more wonderful still that Japan in order to preserve world peace, sacrificed her strategic position and accepted the doctrines laid down by her partners. As we scan the situation in Europe, we see no evidence that any other great power is willing to forego any of the advantages that has come to them as a result of the war. Japan stands alone, the one great military nation that has consented in the interests of world peace to surrender a vital policy.

At the Washington conference her position was again clearly set forth. Japan waived all claims to special rights in China, withdrew her twenty-one demands and whole-heartedly acquiesced in all proposals for the restoration of China's impaired sovereign rights. She made just one reservation. Japan declined to discuss or consider any proposition that might tend to weaken her position in South Manchuria. Even in this, it was with no intention of ignoring the sovereignty of China, or pushing forward aggressive designs. China was admittedly unable to guarantee her neutrality in these regions and with the ever present prospect of Russia returning once more to Harbin and Changchun, Japan had no option but to insist on the recognition of her position in Kwantung. Her position was identical with that set forth by Mr. Balfour in explanation of Great Britain's retention of the Kowloon territory, one purely strategical in its nature forced upon Great Britain because of China's weakness and inability to provide guarantees that a hostile army would not take possession of the Kowloon hills and bombard Hongkong from the land side. Japan stood firmly on the same argument, but with greater justification.

This was Japan's dead line in her concessions to China and world opinion. The Americans, British and French delegations fully understood Japan's unalterable termination to retain the strategic advantages gained as the result of the terrible sacrifice of 1905. In fact, it may be said that the Americans had full cognizance in advance of the Washington conference of Japan's emphatic refusal to consider or discuss any proposals which might in any way refer to her position in Manchuria. It was the recognition of this and Japan's similar acceptance of basic American policies which made the Washington conference possible. This understanding, we have reason to believe, was the direct outcome of General Wood's visit to Tokyo four months before the opening of the conference, when strong men sat opposite each other and indulged in a heart to heart talk. The gist of that frank discussion conveyed to the military leaders of Japan that any attempt on their part to fortify the chain of islands encircling the eastern Asiatic ccast that might, under given circumstances, prevent access of American vessels to the Chinese markets, would be considered as sufficient justification for the United States going to war. On the other hand, the Japanese leaders conveyed in similar emphatic language to the American general that any attempt to interfere with their vital policies in Manchuria would reluctantly force Japan to fight. The irreducible minimum of each other's policies was frankly set forth and the way paved for the diplomats to discuss details and side issues at Washington. Japan would have rejected an invitation to any conference that embraced in its agenda a discussion of her position in Manchuria. This basic fact, recognized by the American leaders, made the Washington conference a success.

Japan has since lived up to her promises. She has relied upon the pledges of her partners in the consortium to respect her vital policies in Manchuria. She willingly consented to a limitation of armaments after the preliminary basic understanding with the United States was arrived at. In every way Japan has since endeavored to prove her pacific intentions. At every step she has receded, the Soviet has moved forward and taken her place. The powers have acquiesced in the Soviet occupation of Mongolia and pressure is now being exerted upon Japan to evacuate the northern half of Saghalien.

With Japan's power for defense undermined by treaties and understandings, the one obstruction to the rapid spread of Bolchevism in Eastern Asia has been removed. The powers, in a fit of jealousy, rejected the right of Japan and China to come together in a military alliance for the defense of their mutual interests in Mongolia and Manchuria and paved the way for the reds to re-enter Urga, extend their authority to Vladivostok and take over the Chinese Eastern Railway. A red force of ten thousand men now occupies Urga with at least 30,000 encamped somewhere in the vicinity of the Mongolian borders. Vladivostok has been handed over to Moscow. The Far Eastern republic has ceased to exist. The refugee whites, left to their fate, are swarming into Korea and Manchuria. The reds control the Siberian railway with their troops quartered at Pogranichnaya on the east and Manchuli on the west. It will not be long before they will take possession of the Chinese Eastern Railway and assume jurisdiction over the railway zone. We will return once more to the strategic situation existing in 1914, with Harbin as the Far Eastern military headquarters of the Russian army and confronting Japan at Changchun. With the red armies in Urga and strung along the Mongolian border lands and Japan hamstrung in the Taonan-Jehol zone, northern Manchuria will once more be lost to China. If Japan recedes one inch in south Manchuria the Soviet will take advantage of China's weakness and advance into the vacated position. This, therefore, is the situation, the world must face in the Far East. Once more the armies of Nippon will be watching the moves of Russia across the narrow strip which separates the northern and southern Manchuria military zones. The situation is loaded with dynamite with the fuses and red flags of danger in place waiting for the traditional humorist who doesn't know the thing is loaded, to playfully close the circuit.

Applying the Match

At this juncture, when the situation is becoming tense, when the Soviet is seeking to break the power of the allies in Europe and extend its influence in Asia, the Chinese seem determined to call upon Japan to evacuate the Kwantung leased territory in March of next year. At a time when China has disintegrated into several independent feudal states; when its so-called central government exists in name only and by courtesy of the foreign powers; when unpaid hordes of disbanded or deserting soldiery uniting with the always present bandit bands and pirate crews defy even the armies of the tuchun oligarchies and carry their depredations into treaty ports and attack foreign shipping; with the treasury a tradition, almost a myth, the vaults empty and the government bankrupt, defaulting on its internal and foreign loans and current obligations; with the salaries of officials months in arrears and the unpaid organized into salary demander's unions; with the Soviet in Urga boldly annexing Mongolia and the red plenipotentiary telling the Chinese they are there to stay; in the face of the most tremendous

crisis in Europe and Asia, powerless to enforce national rights or inspire respect, the Chinese minister of foreign affairs, backed by politicians playing to the gallery and encouraged by foreign advisers who have nothing to lose, selects this moment in which to re-open one of the most delicate questions in Far Eastern history, one, which, if answered according to their desires, would once more bring the Russians to the banks of the Yalu and force Japan to battle for her existence.

It would appear that the present is hardly the time to discuss the pros and cons of the validity of the Manchurian treaty signed as the outcome of the twenty-one demands, and it is certain that if the Chinese foreign office insists upon raising the issue and officially notifies the Japanese minister that the treaty has been declared null and void, a most serious situation will be created. From all present indications, Japan will refuse to disuss the matter. China will then have to take the next step, make good her stand, or be humiliated.

The annulation of a treaty under such circumstances must be supported by force. If China insists upon declaring the Manchurian treaty null and void and Japan refuses to discuss the matter, the situation so created will automatically cause a severance of diplomatic relations, and if a move is made by China to enforce her position, the fat will be in the fire.

China perhaps, has a sentimental case, but appealing as it is, Japan has a strong counter argument. In presenting her claims to the world, China must be prepared to go behind the twenty-one demands and explain her part in the secret diplomacy of 1895 which brought Russia into Manchuria and forced Japan into one of the most disastrous wars of history. China has justly complained of secret diplomacy where her own interests have been bartered away without her knowledge and Americans at least, have sympathized with her, but she must now face the facts in regard to the secret treaties and understandings which made her an ally of Russia, and under whose provisions Manchuria was converted into the base for Russia's attack upon Japan. As far as can be seen to date, China rests her case on the fact that the Manchurian treaty was extracted under compulsion as a result of the twenty-one demands. If the revelations of Sazanoff at the Paris peace conference and the confessions of Count Witte be ignored, China is in a very strong position, but if we accept the facts disclosed by these two Russian statesmen, China will have to explain her part in a secret alliance which forced Japan to make such terrible sacrifices in 1905. It may well be, that Japan, if forced, may also go behind the twenty-one demands and in the light of evidence which makes China an accessory to the war of 1905, demand compensation for the part she took in bringing about hostilities.

Chinese authorities declare, that the secret Li-Lobanoff alliance was vitiated in 1900 by the action of Russia, that China was not responsible for what happened after that date, but, on the other hand, there is public no record that the treaty was officially denounced, and it is also true, as far as Japan is concerned, that the damage was done previously to that date by handing over Manchuria and the Kwantung territory to Russia in compliance with the object and aims of the alliance. Japan, as yet, has never raised the question of China's part in bringing about the war with Russia. She fought the latter and restored to China her sovereignty over Manchuria, which the Russians had determined to create into another Bokhara, closed to foreign trade and travel. Instead of being called upou to indemnify Japan for her part in an alliance which precipitated the war, China escaped scot free, and even had her provinces returned to her, the first and only instance we are aware of where such magnanimity on the part of a victor is recorded. China escaped paying the penalty for her double dealing by reason of the diplomacy which maintained the existence of the treaty of alliance a profound secret until 1919.

New facts call for a reconsideration of all cases, whether with nations or individuals. Judgement has often been reversed and the original verdict set aside after a lapse of years by the disclosure of new evidence. This has a special bearing on the much discussed Manchurian question, and it was the revelation of this new evidence in 1919 which modified our own views on basic Far Eastern problems. The publisher of THE FAR EASTERN REVIEW carried the brunt of the newspaper campaign in the United States in 1915 against the pretenses of Japan in the twenty-one demands, and it was admittedly due to these labors that the American government placed on record in its memorable note of May 15 of that year, its refusal to recognize any treaties which might in any way impair the rights of American citizens in China or the principle commonly known as the "open door" principle. We fought that campaign for China in complete ignorance of vital facts bearing on the Manchurian situation. We have never reversed our opinions, however, on other matters, and have strongly urged the Japanese at all times to return Shantung to China at the earliest opportunity, withdraw their troops from Hankow and in every way prove by actions the sincerity of their friendly professions towards their weaker neighbor. At the time we acted as "counsel for the defense" of China's case in 1915, the existence of the Li-Lobanoff treaty was still a profound seeret. Once the text of that document was revealed at Paris it compelled a complete modification of established views, and explains in part, why, since that time, we have been unable to conscientiously support a secret diplomacy which compelled Japan to pay such a terrible price.

We have explained these matters fully in previous articles and quoted Count Witte at length in support of our views, but to date the majority of Far Eastern experts have preferred to ignore the importance of these revelations or their bearing on fundamental problems. No Chinese or American writer has commented on a document upon which is built the history of the Far East since 1895, and we have reason to believe that it was our own repeated references to its existence, that finally called forth at Washington an official acknowledgement of its text by the Chinese delegation, at the call of Mr. Hughes for the filing of secret treaties. We were quick to see in Paris that the facts surrounding this alliance completely undermined American policy in China, and placed John Hay in the position of advocating a doctrine based on the recognition of China's sovereignty, after the latter had willingly handed over and impaired her integrity in order to be revenged upon Japan. A policy that could not and did not preserve Japan from attack by Russia through the territories of the nation the policy was created to benefit, is, on analysis, no policy at all, but a mistake due to secret diplomacy, that worked out to the advantage of Russia.

The importance of this document, tardily acknowledged by the Chinese delegation at Washington, seems to have been lost even in subsequent discussions on Far Eastern problems. It was only recently, that the adviser to the president of the republic of China, Mr. B. Lennox Simpson, quoted the Russian statesman in order to strengthen China's contention that the Russian government was not the owner of the Chinese Eastern Railway. When Mr. Simpson, in his dual capacity of Far Eastern expert and adviser to the president of China, quotes Count Witte in order to fortify a case for the Chinese government Witte's evidence must be accepted in other matters. Witte's testimony concerning the Li-Lobanoff alliance must therefore carry conviction, and with the subsequent filing of the treaty at Washington, China stands exposed before the world of having secretly aided, comforted and encouraged Russia by ceding her territories to the latter in order to revenge herself upon Japan. When it is recalled that this secret treaty of alliance was in full operation during the Russo-Japanese war, and that in conformity with its provisions, the Russian Baltic fleet might have entered the port of Foochow and employed it as a base for recoaling and refitting before hazarding the great battle

of the straits of Tsushima, it would have meant for Russia the difference between defeat and stalemate. As admitted by Mr. Lennox Simpson in his new book, " those amongst the delegates at the Washington Conference who had personal knowledge of the Far East were impressed by this flask of lightning into the murky past!

When it is furthermore recalled that Russia played false to her ally and would have annexed Manchuria and closed it to foreign trade, the Japanese are fully justified in the claim that they restored China's sovereignty over her lost Three Eastern Provinces. This, notwithstanding the secret alliance which made the Russo-Japanese war possible.

As to the twenty-one demands they went too far and covered too much ground. If granted, they would have made China for all practical purposes, a vassal of Japan. It can, however, be said in extenuation, that Japan was sorely provoked and hard pressed, owing to China's continued intrigues with Russia, either direct, through her ally or through her financial agent. It cannot be denied that Russia was exerting every effort (in which she was supported at all times by France and Belgium) to get into a position that would enable her to resume the conflict terminated by the truce of Portsmouth. Her way was made easy by the weakness and supineness of Chinese officials who paved the way for Russia to dominate their country and strike at Japan from an unprotected flank. Russia's activities in Mongolia compelled Japan to demand the right to construct the Taonan-Jehol railway, already referred to, and later on when it became evident that Russia had split China in half, north to south and east to west by her strategic railways, and that China had secretly handed over to France exclusive railway privileges in Kwangsi, and was hastening the day of her undoing by other concessions impairing her sovereignty, Japan had no alternative but to make sure of her position in Kwantung and Manchuria and enable her when the time comes, to defend not only her own but the integrity of China.

The twenty-one demands could and should have been reduced to one, but true to Oriental diplomacy, Japan lumped together all that she could think of in order to gain her main point. Had Japan confined her demands to the extension of the Kwantung lease she would have obtained all that she had a right to expect to receive from China. In fact, there was no hesitancy on the part of China in granting this extension, as the records of the negotiations go to prove. Japan simply overdid it and lost out before world opinion by attempting to conceal the truth. It was a stupendous blunder, one which cost Japan dearly in the esteem of all other peoples.

However, the basic necessity of holding Kwantung still remains, perhaps stronger than ever, and there is little likelihood under existing conditions that Japan will admit any discussion of the treaty which assures her territory and that of China against further agression from the north. In the twenty-one demands, Japan appeared before the world in the rôle of an aggressor. Since then, she has surrendered or withdrawn all these demands, except one. She insists upon the validity of the Manchurian treaty which extends the Kwantung lease to 99 years. The other clauses of the treaty are not obnoxious in themselves, as by reason of the most-favored-nation clause in other conventions, they extend automatically to all other nations. The rights so obtained are not exclusive to Japan.

In holding Kwantung, Japan's position is changed. It is not a spirit of aggression or desire to impair China's sovereignty which impels her at this time to retain this strategic vantage point. She remains there to defend not only her own safety but the integrity of China during such time, at least, as China's remains unable to discharge her international obligations in these regions.

There remains one important angle to this question which should not be lost sight of. The masses of Japan have supported the liberal statesmen in their many concessions to world opinion and strongly approved of every effort to regain the good-will and friendship of China and make amends for past errors in diplomacy. In fact, it may be said that the cardinal feature of Japanese policy at this date is based on the re-establishment of cordial relations with her neighbor. There is evidence, however, in the Japanese press, that the limit of concessions has been reached and that any attempt to bring pressure to bear upon Japan in order to compel her to evacuate Kwantung next March, will crystallize into a patriotic movement lining up the nation solidly behind the militarists. Liberalism in Japan would then receive a set-back for another generation.

The Japanese already feel that they have surrendered more than any other great power in the interests of world peace, and especially in order to work in harmony with the United States. Any campaign to compel them to relinquish a strategic advantage upon which the very safety of their empire depends, will be more than they will stand.

It is not altogether improbable that the drift of world events, coupled with the agitation over the validity of the Manchurian treaty, will determine Japan to completely modify her present pacific and passive attitude, and following the lead of other powers whose vital interests have been placed in jeopardy, insist upon a readjustment of the *status quo* that will permit her a free hand in Manchuria. Japan may do one of four things. She may call upon the United States, Great Britain and France to enforce the principle of China's integrity in Mongolia. She may demand that China herself be called upon in the interests of world peace to discharge her international duties and defend her own integrity and neutrality. She may demand the right to co-operate with China as an ally in enforcing the consortium doctrine, or, failing in the above, Japan may determine that her own interests are paramount and act as the sole defender of China's integrity and take such measures as she deems fit to assure her own safety.

It stands to reason that no other powers will send troops into Manchuria or Mongolia to enforce a paper doctrine against Russia. Least of all will the United States send an army across the Pacific for this purpose. In fact, the way things are drifting, it will not be long before the United States will return once more to the days of 1917, Chinafied and emasculated by the pacifists, powerless to defend herself against any first-class enemy. Britain and France have troubles of their own and will be more likely to give Japan their blessing and tell her to look out for herself. It is difficult to imagine China at this time sending a force to oust the reds from Mongolia, and if the past is any criterion for the future, an intense jealousy will seek to obstruct any alliance or military co-operation between Japan and China for mutual defense. There remains the alternative, the last resort of a proud spirited fighting race facing slow strangulation through the operation of self-denying treaties entered into for the advancement of world peace, that is to say, peace in Europe, peace in the Pacific and the hamstringing of Japan in Asia.

" Kemal Pasha overthrew the treaty of Sevres and defied the allies in Europe. It may be that Japan, to protect her vital interests, will be compelled to follow his example in order to preserve the integrity of China and the peace of the Far East." These are the words of a highly placed Japanese army officer in concluding a general *resumé* of the present situation. They are significant, and to the point. They carry this warning from Japan to the other powers: " Make good your paper doctrines and protect the integrity of the Chinese republic in Mongolia, or stand aside while we do it ourselves." In the present condition of world affairs there is little doubt of what the answer would be.

II. MANCHURIA

The Other Side of the Question

Japan At the Parting of the Ways

LET us now look at another side of this question. It may not reflect the views of the Japanese government as at present constituted, but that it is advocated by a considerable section of Japanese opinion is attested to by editorials in many influential newspapers. We must face the possibility of Japan falling in line with other trading nations and scrambling aboard the Red band wagon while there is still room in the front seat. Japan may resume friendly relations with Russia, she may enter into a new commercial treaty, and, who knows, she may go one step further, renew the alliance of 1916 and work in harmony with the Soviet for the defense and advancement of their mutual interests in Asia. There are many things that Japan can do that will nullify the understandings already arrived at, which at bottom, all tend to circumscribe her activities and power of defense.

The Japanese are not blind. When they view the efforts of British and American financial interests to gain the good-will of Russia and gather the fattest plums from the wide spreading concession tree, a people forced to look towards Eastern Asia as the source of their food supplies and raw products are not likely to remain altogether inactive while their future is being handed over to others. As the *Osaka Mainichi* puts it:

"In the event the Far Eastern government is annexed by the Moscow government and Soviet rule is extended as far as Vladivostok, what policy is the Japanese government going to adopt? If all that the Japanese government authorities and militarists have been saying about the Soviet rule is to be taken at its face value, this must be said to be a very serious situation. Even Count Uchida, the foreign minister, declared in the diet that the object of the maintenance of the Japanese troops was to prevent the spread of Bolshevism. If this was so, how can Japan effectively prevent the spread of Bolshevism now that the Japanese troops are withdrawn from Siberia and the Soviet rule threatens to extend to Vladivostok?

But we incline to the belief that nobody will be really alarmed by the new situation. For we know that the theories so far advanced by the government authorities and militarists were invented simply for the purpose of justifying the continued maintenance of the Japanese troops. They never seriously thought that the Japanese people, if left to themselves, would be converted to Bolshevist ideas.

The dissolution of the Far Eastern republic and the display of red flags throughout Siberia need cause no alarm in the Japanese minds. The necessity of the moment is how to shape the policy of the Japanese government to meet the new situation. In other words, it is important that the Japanese people should look the new fact full in the face and devise the best means possible to cope with the new situation. As we have urged in these columns, it is incumbent upon the Japanese government to try to promote the state interests on the basis of friendship with Russia."

From the above, it would seem clear that the *Mainichi*, speaking for the great industrial community of Osaka, would rather see its government follow the lead of Great Britain and America and get in on the ground floor while the door is open. The *Japan Times*, in one of its severe criticisms of the foreign office, is also alarmed over the many commercial advantages secured by others while Japan is still on the outside, and asks:

"What plan have our diplomatic authorities in mind for dealing with Russia? While they are hesitating and undecided, adopting the watching and waiting attitude, the Europeans and Americans lose no time in reviving economic relations with Russia and have already established good foundations for re-opening connection with Russians economically.

The foreign office authorities are apparently waiting for the arrival of the time when the Russian government is willing to accept Japan's demand for compensation on account of the damage caused by the Partizan raid on the Japanese in Nikolaivesk. No doubt Russia is held responsible for the regrettable affair, but at the same time Japan should listen and consider Russian claims. The Russian delegate M. Joffe declared at the Changchun conference that Russia suffered immensely through the troops of Japan and incurred an estimated loss of approximately 100 million yen through the devastation of agricultural produce, requisition of farm houses; stoppage of fishery and communications, etc. The claim of the Russian delegate is not without some reason. But if the spirit of mutual concession is not adopted any amount of negotiations between this country and Russia will not avail. In the meantime the concessions are going."

This also indicates that certain elements in Japan are anxious to follow the "Business First" slogan of other trading nations, and let vital strategic policies go hang. The above and other similar expressions of Japanese editorial opinion reveals a desire to re-open relations with Russia, which, in the very nature of things, will bring about an understandng in regard to their respective rights and positions in Manchuria. Typical of the reading matter which sets the Japanese to thinking seriously, is the interview between the Moscow correspondent of *The Times* (September 28) with the chief of the delegation of the Far Eastern republic sent to the Washington conference, in which the latter says:

"The Japanese are out for the northern half of Saghalin, and large concessions in Kamchatka and the Priamur, and they will not be content with less.

"Meanwhile, America is interesting herself more and more in Siberia. General Graves, formerly in command of the American force which landed at Vladivostok in 1918, and now interested in various concessions in the Priamur, is on his way to Vladivostok from Seattle, along with Mr. Grossbardt, an engineer with extensive Siberian experience, and the representatives of several large financial concerns in the States. They are all interested in those concessions, and so is *General Wood*, Mr. Henry Hunt, of Cincinnati (engineering firm), Messrs. Montgomery & Co., of New York (bankers), the National City Bank, the Koehn Loeb Company, the Guarantee Trust Company, the Equitable Bank, the Baldwin Locomotive Company (which is talking of repairing all the railways in the territory of the Far Eastern republic, if normal political relations are restored between that government and Washington), Messrs. Funston, of New York and St. Louis (fur people), and Robert Dollar, timber merchant, who is getting forest concessions in Eastern Siberia.

"The concessions which General Graves is said to be after are gold; but personally I think that no hard-and-fast agreements have so far been concluded between the Chita government and any American groups. General Graves, I take it, is simply going to Siberia to have a look around; and I think that he will find labor, political, economic, and transport difficulties so great that no work can be done for years. . . . By the time my informant and his delegation reach Chita, General Graves and his friends will be there, and arrangements about Russo-American commercial co-operation in the Far East will have been begun. It was probably a knowledge of this activity on the part of the Americans in Eastern Siberia that caused the Japanese to announce recently that they were leaving Vladivostok, and to agree to an exchange of views with the representatives of the Moscow government and of the Far Eastern republic.

"The Baldwin locomotive people are to repair all the railways in the Far Eastern republic, and other large American concerns are talking of undertaking other work and taking up other concessions; but so far this has not got beyond the talking stage, and all depends on the regularization of political and commercial relations between Russia and the States. Possibly, said my informant, America will first recognize the Far Eastern republic and do business with her, and then be led on to recognize the Moscow government.

"He maintains that the Far Eastern republic is not communist, but a democratic state, independent of Moscow, but under Moscow's protection at present owing to the Japanese menace. He looks forward to the time when Vladivostok will be quite clear of Japanese and will constitute a door opening out towards America, and with nobody blocking it. When that day comes America will do very big business in Eastern Siberia, as she did before the war."

The reference to General Wood being interested in Siberian concessions is pure piffle and indicates the extent of the belief in Russia that Americans of all classes are anxious to get in on the ground floor. The above interview is supplemented in the *Japan Times* by the following:—

"While our diplomatic authorities are indulging in their wonted idle day dreams and forming mistaken policy towards China, the ambitious Americans have succeeded in courting the goodwill of the Chinese and won both their trust and rights and interests from the Chinese. Again while the Japanese diplomats were occupied in endless and useless negotiations with the Russian delegates at Changchun, a certain American concern obtained the lease for the oil district in Northern Saghalien and will start working the field shortly. Though outwardly against Russia, the Americans have secretly shaken hands with the Russians and are securing rights and interests in Siberia ahead of all other nations.

"Not only America, but Britain also is anxious to revive economic relations with Russia and France is casting sidelong glance Russiawards. The latest dispatch from Moscow says that France is anxious to revive her old friendship with Russia and re-enter an alliance with that country. With this in view, France is opposed to Britain's Dardanelles policy and wants to support Russia, thereby to court the goodwill of Russia. In other words, France objects to the proposal of Britain to solve the Dardanelles problem, excluding Russia, and insists on the injustice of settling the question without Russia's participation in the negotiations.

"While nearly all of the world powers are eager to court the goodwill of Russia in order to secure rights and interests in Siberia and thereby enhance their national coffers, Japan alone refuses to shake hands with Russia and commits the folly of missing a fine chance, open to her, for securing economic rights and interests in Siberia, which will fall entirely into the hands of far-sighted nations and be lost to Japan when she wakes from her slumbers at the eleventh hour. Who knows when another Washington Vanderlip may appear and carry away the right of exploiting the vast, inexhaustive, and rich resources of Siberia, lying so closely in Japan's neighborhood ?

"Remarkable are the activities of the Americans, who fixing their eyes on these resources of Siberia, are striving to secure rights and interests to explore and exploit the world's treasury of wealth in Saghalien, the Maritime province and Inner Siberia.

"A report to hand says that only a few days ago the American warship *Monoghan*, conveying several American congressmen and representative American businessmen, arrived in Vladivostok on an exploration trip to observe the condition obtaining on Commandorsky island, called the world's great treasury of fur seals, and the coast district of Kamchatka. The party is reported to have already concluded its mission and reached Vladivostok with a view to further observe the condition in the Omsk district in Inner Siberia. This is just a single instance, illustrating the daring spirit and far-sighted enterprise of the Americans."

We have quoted the above editorial at length as representative of a certain section of Japanse thought. If the Japanese accept these stories as true, they are justified in believing that advantage is being taken of their disputes with Russia and China to supplant them economically in regions from which they were compelled to withdraw under pressure of foreign opinion. It is clear to the close observer that the Japanese are awakening to the suspicion that in Siberia, as in China, other interests have taken advantage of their vital strategic necessities to undermine them economically. With the prospect of China declaring the Manchurian treaty null and void supported by foreign sympathy, and thus destroying her economic foothold in Manchuria, Japan would then be dependent upon Eastern Siberia for a large part of her raw products and other necessary supplies. Under these conditions, with all doors closed to her people in lands dominated by the white man, debarred from settling in China through the operation of laws which exclude foreigners from owning land outside the treaty ports, and confronted with the possibility of relinquishing her position in Kwantung, while watching American and British concession hunters skimming the cream from the Russian business, it is not to be wondered that a considerable section of public opinion in Japan is now advocating recognition of the Soviet, the establishment of friendly relations, restoration of trade and recognition of mutual interests in disputed territories.

In plain words, the operation of Western diplomacy combined with the moral support of the West to China in raising the issue of Japan's position in Kwantung, may have the effect of throwing Japan into the arms of the Soviet as the one assurance that her vital economic interests in Manchuria will be respected.

This element in Japan believes there is little to be gained by casting in their lot with America, Great Britain and France, whose altruistic policies towards China and Russia forced a surrender of their vital strategic and economic positions. The operation of these same policies has permitted Russia to once more regain a position inimical to Japan's safety, where, if matters are permitted to drift, the issue of 1904 will have to be fought out anew. Instead of advancing her economic and tactical position by an alliance with Britain, America and France, Japan finds herself stripped of all advantages and once more face to face with Russia in Manchuria with a movement launched with the moral support of a large section of Americans and British, to deprive her of her key position. The time is fast approaching when she must either take on her own shoulders the maintenance of the consortium principles and defend the integrity of China, or, follow the road of least resistance, by joining the procession and climbing into the Pink painted band wagon.

If Japan should elect to take this path out of a difficult and dangerous situation, what about the future? Why should Japan fight Russia for the maintenance of a principle that no other power will use force to uphold ? Why should not Japan be friends with Russia and resume their understanding in regard to each other's positions in Manchuria and Mongolia ? Why should Japan follow along in the company of partners who at every turn are reaping the commercial advantages while she is being reviled and held up to world scorn for practicing in Asia what other powers are applauded for doing in Europe ? If this line of thought should prevail and the people and government of Japan elect to resume friendly relations with Russia, and so obtain recognition of their economic position in Manchuria and the right to exploit valuable concessions in Eastern Siberia, who would check the forward moves of the Soviet backed by Germany in other parts of Central Asia? If Japan declines to antagonize Russia in Asia, what then ?

Russia has many friends in Japan and it was the weight of their opposition as much as foreign criticism which finally inclined the government to withdraw its troops from Siberia. If their policy should prevail, it would not be difficult, at this time, to bring Japan and Russia together in an understanding that would have a most far-reaching effect on the Asiatic problem. Japan stands at the parting of the ways.

III. MANCHURIA

STUNG!

NOW comes Viscount Takaaki Kato, Japan's foreign minister in 1915, who drew up the twenty-one demands, and states that there are no grounds for the allegation of China that the treaties based on the demands were signed under compulsion." "THE ULTIMATUM," the viscount declares, "WAS SENT TO CHINA ON THE REQUEST OF THE CHINESE GOVERNMENT IN ORDER TO SAVE THE FACE OF THE AUTHORITIES OF THE NATION"! ! ! ! !

Kato's statement is the most important truth in recent Far Eastern history. It is fundamental. Here we have been laboring under the delusion all these years that defenseless China was the innocent victim of Japanese aggression, forced to sign away her rights at the muzzle of the gun. The whole world has responded to her appeal for sympathy. Japan's ultimatum of 1915 has been the pivot upon which Far Eastern history since that date has revolved, the thesis upon which scores of weighty volumes have been written and scattered broadcast over the world indicting Japan as the ruthless robber, the cold-blooded aggressor, the disciple of Germany in Asia. The ultimatum lined up every American on the side of China and laid the foundation of that hostility which influenced our diplomacy at Paris and led to the calling of the Washington conference to settle our differences. Commencing with the writer, who carried the brunt of the battle for China in 1915, down the line through a list of brilliant journalists, diplomats, advisers and others, who accepted without question China's version

of the negotiations surrounding the twenty-one demands, we all stand before the world as having been used by secret Chinese diplomacy to wage a fight on high moral grounds in order to preserve the face of a scheming dictator seeking Japan's recognition of his right to mount the dragon throne.

The evidence is conclusive that the secret diplomacy of Li Hung-chang precipitated a most disastrous war between Russia and Japan, in which China escaped paying the penalty, in fact, emerging from the conflict as the injured and innocent victim. Now we have the confession of Viscount Kato, which says in effect, that the secret diplomacy of Yuan Shih-kai, the concealment of the most vital fact in the negotiations surrounding the twenty-one demands, created an international political situation which nearly culminated in a war between the United States and Japan, and in which by reason of the profound secrecy maintained, China once more poses as the injured party.

Up to the time we go to press, no newspaper in China has published Kato's statement, and dollars to doughnuts the disclosure has not even been telegraphed to the American or British press by the regular correspondents in Tokyo. Upon the truth of this statement hinges the professional standing scores of journalists, statesmen and diplomats, nay, even the policies of governments must be radically modified to meet this astounding disclosure.

If true, and Kato is the one man competent to make this confession, it is quite evident that Chinese officials are in no need of expert foreign advice. They can give foreign diplomats cards and spades with the joker thrown in, and beat them at their own game. Bret Harte was right:

"In his sleeves, which were long,
He had twenty five packs."

We confess an admiration for officials who can systematically "put it over" the keenest experts and observers, mislead foreign governments to the point of precipitating hostilities, and look childlike and bland while a horde of advisers are playing their game for them. What we cannot understand is the remarkable reticence of Viscount Kato, who, in order to save the face of China, permitted the face of his own country to be lost. Imagine the situation. Pressed to accept the demands, Yuan confidentially suggests that in order to save his face, Japan should present an ultimatum. Kato falls into the trap. Maintaining the most profound secrecy about his part in the incident, Yuan broadcasts the story of Japan's rapaciousness with the result that world opionion swings solidly behind China while Japan is ostracized as impossible, another Germany. Kato dared not reveal the truth and invite attention to his defeat. Only, at the eleventh hour, when China is preparing to press for the retrocession of Kwantung, does he break the silence of seven years, and admit that he was "stung."

The interesting part of this disclosure is that Dr. Sun Yat-sen has insisted upon this version of the facts ever since 1915. He has declared, on several occasions, that it was all a put up job on the part of Yuan who was willing to place China under the tutelage of Japan in exchange for the latter's recognition of the new dynasty he was even then preparing to found. Sun corroborates Kato in that the ultimatum was faked to save the face of Yuan, and permit him to go before the nation as being compelled by superior force to accept the new conditions. At that period Sun was an exile in Japan, working in close harmony with the Japanese general staff. He knows what he is talking about.

The Chinese beat us at our own game with the cards stacked against them. They need no champions or coddling. They are in no danger of losing their independence as long as a sentimental foreigner survives or as long as other nations eye each other with jealousy and fight over the prospect of winning their good-will. A Chinese philosopher a century or so hence will sit on the ruins of London Bridge or the rusting scrap heap that was once the Woolworth Building and chuckle quietly over the fool mistakes of the wild barbarians who tried to hustle the East and teach his ancestors how to do things. This disclosure of Kato will wreck the reputation of many highly placed experts. The very last thing that Mr. Lennox Simpson explains in his recent book "An Indiscreet Chronicle From the Pacific" is the "true facts which have hitherto been closely guarded" surrounding the events leading up to and the reasons for the presentation of the "ultimatum." His version disagrees with that of Viscount Kato and Dr. Sun just one hundred per cent. At any rate, after reading the "true facts" as revealed by the high adviser to the president of China and the *truth* as disclosed by Viscount Kato, we retire to the background as an authority on these matters. We leave it to the high adviser to prove his "true facts" and answer the statesman of Japan, and will watch from the gallery the efforts of other experts to extricate themselves from the mess. It will be interesting to see how they accept the statement of Viscount Kato.

IV. MANCHURIA

Equal Opportunity in Manchuria

WE cannot close this presentation of facts surrounding the Manchurian problem without some reference to an article entitled "Japan in Manchuria to Stay," appearing in the columns of our sprightly local contemporary, *The Weekly Review*, that "aggressive official American organ" whose policy is one hundred per cent. different from our own. The following may help to explain why such a wide divergence of opinion can exist between two exponents of American ideals in the same field, and indicate that this difference is one between hyphenated American sentiment and every-day-horse-sense.

Mr. Charles Dailey, the writer of the article, admits that Japan is in Manchuria to stay. On the whole his article is one of the sanest that has yet appeared on this question, but he destroys the value of an otherwise important contribution to a serious discussion, by harking back to the old fable about Japan's special privileges in that territory which gives her traders the advantage over all competitors. In the Manchurian treaty of 1915, signed as the outcome of the twenty-one requests, Japan obtained for her subjects certain rights as to residence and trade outside the treaty ports, and nearly every superficial writer on the subject has since accepted the first impression that these were exclusive, when, as a matter of fact, through the operation of the most-favored-nation principle, they automatically extended to all other treaty powers. Japan therefore has no special position or trading rights in Manchuria not enjoyed by all other nations. This was admitted by Baron Kato at the Washington conference, when, speaking for his delegation on November 19, he said:

"We adhere without condition or reservation to the principle of the 'open door' 'or equal opportunity in China.' We look to China in particular for the supply of raw materials essential to our industrial life, and for food-

stuffs as well. In the purchase of such materials from China, as well as in all our trade relations with that country, we do not claim any special rights or privileges and we welcome fair and honest competition with all nations."

No Japanese statesman, diplomat or publicist has ever construed the Manchurian treaty of 1915 as conceding benefits to their country, not shared by all. We emphasize this situation, and invite the attention of all sober-minded Americans to the fact that these continued exaggerations concering conditions in Manchuria operate to keep them from enjoying their treaty rights, and to deter them from establishing branch offices in this province. As a result of years of misrepresentation, American firms have developed a case of cold feet in regard to the Manchurian field, and handed over their business to Japanese or British interests. At the present moment, there are just two American firms registered in the American consulate at Dairen, the ubiquitous Standard Oil Company and its pushing competitor, the Texas Company, with a young American occupying desk room in the office of a Czech concern, representing the important vegetable oil house of Aspergren & Company of New York. This is all.

In fourteen years, the South Manchuria Railway Company and allied Japanese industrial enterprises have probably expended $100,000,000 gold for American materials, not to mention the vast amounts that go to make up the exports of bean oil and other products. An equal amount has also been expended for British and other foreign materials. The impression that American firms could not compete in this territory has tended to keep them out, while the vast orders for American materials have been placed through Japanese and British representatives of our manufacturers. The British have obtained their fair share of the orders for British materials through their own firms established in Dairen. The practice of the South Manchuria Railway Company is to call for tenders for supplies and confine their patronage to firms having actual representation in Dairen, a very wise and necessary policy in building up a new city under its own administration. The only sufferers as far as we can see, are American firms who have listened to the tales of their countrymen who threw up the sponge early in the game, and have ever since been damning the "Japs," in order to justify their own failure. One hears little growling or grouching from the British firms in Dairen, who say little, saw wood, and see that British manufacturers receive their share of such business that is offering. The great volume of orders for American material has gone through the Japanese representatives of American manufacturers. A few American middle men have suffered, but American trade on the whole has benefitted. There is no reason, however, why this condition should be perpetuated. If American trading firms want the orders the place for them is in Dairen. They are assured of a square deal, despite the fables to the contrary.

Mr. Dailey, in the article in *The Weekly Reciew*, stresses the point that American firms are discriminated against because of the operation of the Manchurian treaty and cites the following instance to support the contention that this interpretation of the treaty has been accepted by the Chinese authorities:—

"So Chang Tso-Lin seems to be barking up a hollow tree when he says that no matter what Peking may have done under force or duress or whatever the enemies of Japan accusse her of applying—no matter what—Manchuria never has recognized the twenty-one demands. The facts are that the existence and provisions of the new treaty have been recognized by Chang Tso-Lin's ablest henchman, General Sun of Kirin."

"And the recognition came in a way quite unfavorable to the United States, or any other country interested in trade in interior China. Shipments of oil to points in Kirin province are being heavily taxed as a local measure and the Standard Oil Company of New York recently had the matter taken up with the officials of Kirin province, because there was discrimination in favor of the Japanese. It was in reply to this protest that the governor of Kirin made the recognition of the 1915 treaty, if any recognition were required after its enforced acceptance by Peking."

"General Sun, in an official letter to the provincial treasury held that special local taxes could be levied against the American concern because it, with other foreigners with the exception of Japan, is denied the right of establishing agencies at non-treaty ports. The exception in favor of Japan was cited under the 'new treaty' between China and Japan, which means the treaty enforced under the twenty-one demands. Under this treaty, General Sun pointed out, the Japanese are permitted to establish agencies and to carry on business anywhere in South Manchuria, including Kirin province, and in Eastern Inner Mongolia. This clinched the case for Japan. Incidentally it put the seal of commercial handicap upon other foreigners attempting to do business in the non-treaty ports of that region."

It would appear from this that the tuchun of Kirin interpreted the Manchurian treaty to meet his urgent demands for revenues and "held up" the Standard Oil Company for taxes he did not dare to impose upon the Japanese. If, as General Sun points out in extenuation, "the Japanese are permitted to establish agencies and to carry on business anywhere in South Manchuria, including Kirin province, and in Eastern Inner Mongolia," by the same token the same privilege extends automatically to American concerns. The truth that shines out from this instance, is not that Japan has any special advantage over American firms, but that General Sun has for his own purposes construed the treaty to justify an irregularity. Japan is not to blame for this, and it would furthermore seem, that the Standard Oil Company has a legal right to claim and recover not only such taxes as may have been paid in excess of those levied upon Japanese produce but such damages as would compensate for the loss of the trade handed over to its competitors by General Sun's failure to recognize the most-favored-nation principle, which applies in this case.

The situation in Manchuria is identical as that which existed a year or two ago, when such a hullabaloo was made over alleged Japanese discrimination against American trade in Tsingtau, and where subsequent investigation disclosed the fact that there were only two American firms on the ground, the Standard Oil Company and Katz Brothers, the latter working in close co-operation with the Japanese. The reports of the American consul at Tsingtau bore witness to the fact that no such discrimination existed, that the field was open for Americans to enter on an even footing. The damage, however, was done to American trade by continued perversion of facts existing only in the imagination of certain agitators. American firms developed frigid pedal extremities and remained away, while their more adventurous competitors walked in and won out.

American business in Dairen, the commercial door to Manchuria, is conducted by British and Japanese firms because of this same propaganda. It is about time that a stop was put to such distortion of facts, which tend to discourage American enterprise in these regions. If the Standard Oil Company has been made the victim of General Sun by his failure to discharge the treaty obligations of his government, it certainly does not indicate discrimination against American trade by Japan. The shoe is on the other foot; China is the villian in this plot. Perhaps this may be accepted as an disinclination on the part of the American government to recognize these treaties. That, of course, puts the whole matter on a different basis, which works out to the detriment of the American trader until such time as the treaty is revoked. This carries the situation into realms of delicate international politics, and in view of Japan's determination to retain at all hazards her position under this treaty, creates a most serious question. We doubt, however, whether this view of the matter is the correct one, as it would call eventually for American armed support to China in demanding the retrocession of Kwantung and the nullification of the treaty. Perhaps the revelations of Viscount Kato as to how the ultimatum was invited may reverse current opinion on this much discussed problem, and open the way for American firms to enter Manchuria on an even footing with those of Japan and compete or co-operate for its development. Whatever rights Japan has acquired in Manchuria, aside from the extension to the Kwantung lease, are American rights as well. As long as the treaty is in operation, Americans are entitled to all its advantages. If we fail to exercise those rights, it seems unfair to shoulder our failure on to Japan.

V. MANCHURIA

Politics and Pedestals

"An Indiscreet Chronicle from the Pacific"

Being a Review of a Book with the above Title written by B. L. Putnam Weale, and published by Dodd, Mead & Company of New York. For sale by all Booksellers.

"MEN'S legs are more important as a political indication than their hands and heads and should always be attentively studied," says Putnam Weale describing the "dislocated knees and small feet" of Secretary Hughes, denoting, according to the author "a proneness to the influence of others: a tendency to accept formulas without proper inquiry; an absence of true convictions." "Questions are never indiscreet, answers sometimes are," is the maxim on the title page quoted from Oscar Wilde. This emboldens us to be inquisitive and ask if the Adonis-like proportions of the nether and pedal extremities of the hero of the forbidden palace were in any way dislocated on a memorable occasion by that "mighty up driven blow of his right knee" which curled up the chief eunuch guarding the untasted forbidden fruit of an emasculated emperor? We ask this, because if the contour of a man's pedestals is any indication to his political balance, then the author of *Indiscreet Letters from Peking* and still further indiscreet chronicles from the Pacific should possess a marvellouslly corrugated pair of artistic plinths, or a leg like unto the hind one of a Boston bull pup. Which calls for explanation.

The publisher's note to the new book says that "Putnam Weale is the pen-name of Bertram Lenox Simpson, an Englishman in the political section of the office of the president of China. Beginning his official career twenty-six years ago, under the late Sir Robert Hart, the famous head of the revenue in China, he resigned after the seige of the legations and began writing books of which there are now nearly twenty to his credit. Of his former chief, he says, "He trained me with a rod of iron." His literary method discloses his early training. After the revolution of 1911-12 he received offers to re-enter the government service. But it was not until 1916, and the overthrow and death of Yuan Shih-kai, that he resumed work in the political department. Since then he has been sent on many missions and is *mainly responsible for the reports on foreign affairs.*"

Mr. Lenox Simpson is an accomplished writer, the best the Far East has produced, but we incline to the belief that Sir Robert made the mistake of his brilliant career in not completing the training of his promising protege. If he had, the literary methods of Putnam Weale in political affairs might have been another feather in the cap of the great I. G., another monument to his training and handling of men. And to make this clear, we will quote from page 9 of "An Indiscreet Chronicle from the Pacific."

> With the collapse of China the immense corruption of Russian imperialism had at last reached the Far East in force by the land route. Russia had been nibbling for a generation: now she opened her mouth and bit hard. The balance of power was not only changed by this event, but history inevitably took a new road far away from the sea-lanes which had until now monopolized attention. The greatest importance must be attached to this dislocation which has no parallel in the annals of the East, and to which is directly due practically all world disturbance during the last quarter of a century.'

Right here the author started out as Sir Robert would have him do, standing squarely upon an admirable pair of legs with both feet firmly planted in a truth. The collapse of China in 1895 and the secret alliance entered into immediately afterwards in order that China might be revenged upon Japan, is the KEY to all future political events in the Far East, the play which started every European power and Japan, to protect their interests in Asia by countermoves on the political chessboard. But because Mr. Lenox Simpson is the high political adviser to the president of China, and director of Chinese political propaganda, he would never admit a truth that throws the onus of what followed on to his clients. He is paid to avoid this. He makes a good job of it.

On page 11, after a brief *resumé* of other conditions, Mr. Simpson tells us:

"The Russo-Japanese war put Japan back where she had tentatively been in 1895, with the valuable addition of railways. IT IS FROM THIS MOMENT THAT THE MODERN HISTORY OF THE FAR EAST COMMENCES."

Right here Mr. Simpson shifts his foothold and steps from a solid foundation into a morass, flounders around for some 250 pages, then jumps out for a minute on to terra firma before once more slipping back into the bog, where he remains. If Mr. Simpson's first statement is correct and Russia's advent into Far Eastern politics is responsible for all world disturbances during the last quarter of century, then modern Far Eastern history begins in 1895 and not with the Russo-Japanese war, ten years later.

The immediate outcome of the Sino-Russian secret treaty of alliance was to present Russia with an ice-free port on the Pacific, at that time a direct challenge to British sea-power in the East, a menace to her hold upon India. When Russia started on her secret program to reach the northeast frontiers of India by means of strategic railways traversing the territory of her ally, evading her convention with Great Britain to confine her railway activities north of the great wall, the British government presented its demands to China, backed by an ultimatum, for compensatory damages. The Yangtze valley region was created into a zone of strategy to act as a buffer between India and Russia. Subsequently, to counteract the operation of the Sino-Russian partnership, Britain entered into the alliance with Japan. Instead of being an instrument for the impairment of China's sovereignty, the Anglo-Japanese alliance was a guarantee of her integrity jeopardized by her own foolish pact with a power intent upon her spoliation. The evidence of this is seen in the peace of Portsmouth, where China's sovereignty was restored over the territories she surrendered to Russia, and considered by the latter as part of her empire, to be converted into special preserves similar to her possessions in Central Asia.

When this fundamental fact is recognized, the bottom falls out of Mr. Simpson's elaborate case built up on another hypothesis. The book deals with steps taken largely on the initiative of Mr. Simpson to bring about the demise of the Anglo-Japanese alliance treaty, and to accomplish this, he ignores the origins of policies whose operation he denounces; he eliminates from the record the

A FUNDAMENTAL TRUTH

"I am thoroughly convinced that the blood-stained heights of Port Arthur will never be surrendered and the territorial lease cancelled until the part they played in destroying Russian imperialism has been fully and adequately recognized by China in messages to Japan."—*Putnam Weale.*

memorable months of 1898, when the "Battle of Concessions" parcelled China into zones of strategy, miscalled spheres of interest, and starts his history with the Russo-Japanese war, in itself the culmination of ten years of China's secret diplomacy.

Instead of frankly admitting, or at least referring to the causes underlying the signing of the first Anglo-Japanese alliance, and so justifying his own country before China for taking such measures for the protection of its vital interests, Mr. Simpson falsifies the record by insisting that the real rôle of the alliance was to impede the progress of and do for China the greatest disservice any foreign agreement had performed at any time in her history." As Mr. Simpson starts out to destroy this instrument, he naturally goes to extremes and ascribes all the woes of China to its operation, purposely refraining from any mention of the fact that it was China herself who invited and made it necessary.

We might write another volume analysing the "Indiscreet Chronicle from the Pacific," and, by comparing notes, show how the words and views of other advocates of extreme measures coincide with those of Mr. Simpson: how the desperate efforts in China to support Mr. Millard when he was calling for war in Congress, all played into the hands of the Peking plotters, how the campaign in England to intimidate the British government by the threat of a boycott of British goods if the alliance was renewed, synchronized with the agitation in Shanghai directed from Peking; how an international association in North China, consciously or otherwise, encouraged the Chinese by distributing confidential pamphlets calculated to incite hatred against Japan; in fact from the knowledge gleaned from Mr. Simpson's indiscreet revelations we might be justified in denouncing and arraigning the misguided sentimentalists, whose utterances and actions made possible the plot hatched in Peking to railroad the United States into hostilities with Japan.

It might be indiscreet to request Mr. Simpson to be a little more explicit as to the meaning of the word "WE," employed so often throughout the book. "In Peking, long before the world war, *we* had reached the conclusion that there were only two countries (America and Great Britain) important to the Chinese." . . . As early as the spring of 1920, *we* had decided in Peking that no reasonable hope could be entertained for China's salvation with this treaty (the Anglo-Japanese alliance) in the way." What do you mean, WE? Do you mean, Mr. Lenox Simpson, Putnam Weale and yourself; do you mean Putnam Weale and the Chinese government, or Lenox Simpson, and the other high advisers to the Chinese government? Who was responsible for this great war program in which "China would seek a rapprochement with the United States and offer her naval bases on her coasts together with any other concessions she may desire"? Who drew up the confidential plan called "The defence of the gulf of Chihli scheme, designed to protect the approaches to the capital, Peking, pending *American* mobilization"? Are we to suppose that here is where the "WE" is intelligible, and it means that Mr. Simpson and the Chinese government had the plan all drawn up to precipitate the "show down" and hold the gulf of Chihli pending the arrival of American forces? If ever an international intrigue justified the investigation of a joint congressional committee, this conspiracy hatched in Peking to plunge the United States into a war with Japan, calls for action. It was not Great Britain, France, or any other power, who was to rake the Chinese chestnuts out of the fire, but *America*. And at the head of this conspiracy, in full possession of all its secrets stands THE HIGH ADVISER TO THE CHINESE GOVERNMENT, the unofficial head of the Waichiaopu, who confesses in his introductory note to be "mainly responsible for the reports on foreign affairs."

The evidence seems conclusive that the high adviser to the Chinese government, working through the various Chinese publicity bureaus and other organizations, had the American community in China hypnotized, willing to sacrifice the lives of thousands of their countrymen in a terrible war, for the sake of covering up the mistakes and intrigues of a clique of paid international mischief-makers having their headquarters in Peking. There are no laws to protect a nation against damphool sentimentalists and paid propagandists and in the light of the disclosures of the past three years, it is high time the American congress bestirred itself to investigate this situation, and make impossible another such brazen plot to plunge the country into war.

There is no excuse for Mr. Simpson's ignoring of vital truths and building up his case on evidence he hoped might pass without challenge, for on page 193, he gives the text of the treaty of alliance between China and Russia of May 1896 as submitted to the Washington conference by the Chinese delegation after Secretary Hughes proposed that all such secret committments be filed. That China was not prepared for this is clearly intimated by Mr. Simpson, who tells us that the delegation obtained the text of this treaty by telegraph from Peking. This admission is proof that the Chinese advisers hoped to further conceal this document and hazard their case on its being forgotten. Mr. Simpson admits there was ample evidence during 1900 that both China and Russia were acting in terms of the secret understanding, several clauses of which had been duly executed. He acknowledges that it was in force during the Russo-Japanese war, and that if Russia had invoked Article 3, it would have meant the difference between defeat and stalemate. In view of this, it is inconceivable how such a clever advocate, could hope to carry conviction, by ignoring the basic evidence in the case.

Towards the last, in his summing up, Mr. Simpson drags himself out of the mire and muck of Oriental intrigue shakes the kinks out of his twisted pedestals and proclaims one more basic truth when he says:

> "I AM THOROUGHLY CONVINCED THAT THE BLOOD-STAINED HEIGHTS OF PORT ARTHUR WILL NEVER BE SURRENDERED AND THE TERRITORIAL LEASE CANCELLED UNTIL THE PART THEY PLAYED IN DESTROYING RUSSIAN IMPERIALISM HAS BEEN FULLY AND ADEQUATELY RECOGNIZED BY CHINA IN MESSAGES TO JAPAN."

Exactly. Here speaks the true Far Eastern expert. This one paragraph almost absolves Mr. Simpson for the many errors he is guilty of in his most interesting contribution to Far Eastern history. Why could he not have commenced with this truth and built up his argument along these lines? Why should he not now begin to educate the Chinese to this wholesome fact? Why continue to surround his clients with a halo of his own making, screening their shortcomings, while reviling his own country and Japan for defending themselves against China's secret diplomacy?

If Mr. Lenox Simpson is an honorable gentleman and adviser, it is duty to the people whose government holds him "mainly responsible for the reports on foreign affairs," to undo his mistakes and strive to implant in the minds of the Chinese that Japan is their friend, that Japan saved Manchuria in 1905 and restored their sovereignty over a vast territory which by all laws of war they had forfeited. If Mr. Simpson, will now contribute his knowledge, his literary and political talents to bring about a solid and lasting understanding between China and Japan by urging the

Chinese to act upon his last statement, then indeed may the world hope for a proper solution to the Manchurian problem. He may then look back and be grateful for the iron training of his old chief and even aspire to outshine the great I. G. in prestige.

Reverting to pedestals, it would seem that all those who did not agree with or accept the formulas of Putnam Weale or insisted upon proper inquiry, came in for an inspection of their extremities. In the case of Sir John Jordan, although no reference is made to his legs or feet, their characteristics according to Putnam Weale's rule of thumb may be inferred, when he says that Sir John "had few ideas and always hoped for the best when his actions were producing the worst." Knowing how long Mr. Lenox Simpson was in disfavor with his own legation, it would indicate that this alleged paucity of ideas and "veneration for the foreign office," arose from Sir John's refusal to accept the false premises and formulas of the expectant adviser on foreign affairs. When we recall that it was Sir John Jordan who told the China Association last year that "nearly all of the trouble that has arisen in China since 1895 was due to Li Hung-chang's diplomacy," it is not difficult to understand why Putnam Weale and the distinguished representative of his country could not agree.

Now the facts would prove that Putnam himself is most prone to the influence of others and has accepted or invented the Chinese formula of how their troubles started, without proper inquiry. However, if he follows his latest hunch and restores friendly relations between the two nations he has labored for so long to part, he will become the greatest of China's many high advisers, and there is little doubt that a grateful sovereign on some of his many birthdays will affirm the premature accolade of T. P. O' Connor in the house of commons. We will be the first to acclaim "Sir Lenox" and wish more power and symmetry to the present somewhat battered and twisted index to his political acumen.

The Crime Against America

The Conspiracy Hatched in Peking to Railroad the United States into War with Japan

AN APPEAL TO AMERICAN EDITORS AND PUBLIC OPINION TO DEMAND A CONGRESSIONAL INVESTIGATION INTO THE ORIGINS AND RAMIFICATIONS OF THE PLOT TO FORCE HOSTILITIES IN THE PACIFIC

* * *

THE UNITED STATES HAS BEEN PLAYED FOR A SUCKER.—The evidence presented in the foregoing pages reveals the existence of a deep laid plot hatched in Peking to force the American people to take up arms against Japan in order to right the grievances of China against that nation.

A repetition of the horrors of the war in Europe was to have been brought home to the peaceful and unsuspecting people of America in order to support the immature and grossly partial conclusions of a group in Peking posing as experts on Far Eastern affairs.

Had it not been for the sober common sense of such men as Judge Elbert Gary, Mr. Thomas Lamont, and other equally patriotic leaders of American finance and industry, who at the very beginning of the agitation, lent their moral support to the counter campaign which culminated in the Washington conference, the agents of Armageddon would have succeeded in their devilish plans.

The story is a long one. The main facts are known. The recent book of B. L. Putnam Weale provides the key that makes clear what lay behind the recent war scare: it helps us to understand the inner workings of the Japanese boycott, the campaign for the cancellation of the Anglo-Japanese alliance and the agitation in Shanghai threatening British trade with similar reprisals; it explains the questionable methods employed in disseminating literature, calculated to fire the hearts of Americans into being the goat for China; it explains many other things.

Dr. Paul S. Reinsch in his letter of resignation to President Wilson calling for a "show down" with Japan, stressed the part the American navy could have taken in calling Japan's bluff and declaring that "Japan would be absolutely powerless in the face of a stoppage of commerce and a navy demonstration on the part of any one of the great powers."

This provided the plotters with the opening to abuse American sympathy, and we find Mr. Lenox Simpson saying the same thing in another way. "THE ULTIMATE PUNISHMENT WHICH SOME HAD SEEN FOR THEM (THE JAPANESE) IN A RIGID BLOCKADE OF THEIR COASTS BY AN ANGLO-AMERICAN FLEET, SEEMED TO HAVE DRAWN PERCEPTIBLY NEARER." His further revelation of the plan of campaign which provided for an alliance between China and the United States in which China would offer her naval bases to the American fleet together with the naval scheme for the defence of the gulf of Chihli pending American mobilization is convincing evidence that the indiscreet publication of Dr. Reinsch's letter of resignation was seized upon to push forward the plot.

The American ambassador at Tokyo, acting on instructions from Washington, categorically denies on behalf of the American government that it possesses any knowledge of the great Sino-American naval scheme drafted by the plotters in Peking. Yet the Americans in Peking were on the most intimate terms with everybody prominent in this conspiracy. Somebody blundered; somebody should have discovered this plot and informed the government, but from all appearances they were hypnotized, lulled to sleep by the flattering attentions of those who were using them as dupes.

If it was not criminal in its larger aspects, such a scheme would be grotesque, a mirth provoking joke, one which would have lured the American army across the Pacific, and even if our transports ever reached the Chihli Gulf, they would have found on disembarking—another Daiquiri.

We cannot, however, ignore the revelations of Mr. Lenox Simpson. He occupies a high position in the Chinese government. He communicated this secret plan to the prime minister of Canada in his official capacity. Where then were the Americans in Peking while this great plot against the peace of their country

was being hatched by the Chinese general staff? With an ex-American minister in the employ of the Chinese government as high political adviser; a retired American naval officer and former naval attache at Peking acting as marine adviser to the Chinese government, and a staff of diplomatic, army and navy attaches and a wonderful intelligence organization on the job every minute of the time, in close laison with Chinese officials, a plot was hatched under their very nose to force their country into war with Japan and they knew nothing about it.

A striking commentary on the working of this system is seen in the recent publication of Mr. Simpson's full confidential report to the president of China on the carrying out of his mission in the columns of the "Tientsin and Peking Times," a British newspaper published at Tientsin, from which it must be inferred that if the document was not released for publication by the chief executive of China, it must have come from the author. We understand it was stolen. Remarkable how easy it was for this British journal to obtain a stolen document, when the parties most concerned, were maintained in such profound ignorance of the original plot. This, in Peking, notorious for its facilities to obtain confidential information. This, in itself, establishes a community of inside interests that should merit and hold the attention of all honorable Americans interested in the welfare of their own country.

We do not wish to be misunderstood. From such knowledge of the facts as we have been able to piece together, the truth stands out in flaming letters a mile high, that this great international conspiracy, this super inter-allied board of strategy sitting in Peking so secretly, that the American legation knew nothing about it, had prepared a scheme that would have held the fort until AMERICAN MOBILIZATION. Mind you, not BRITISH mobilization.

And from the evidence so far presented, the president of the board in possession of the secret plan of campaign, and employing it as an argument to advance his mission abroad was . . . BRITISH. In the operation of this great triangular alliance, the Americans were the poor suckers who were to have pulled the chestnuts out of the fire. And we wish to say to our British readers, right here, that in making this statement, we are satisfied that these methods did not meet with the approval of the great mass of honorable Britons in this part of the world, or their government. This is proven by the reception given to Mr. Simpson in London.

The high points in the campaign are now before the world. It remains for an official investigation to piece them together and report the facts to the people of the United States, in order to show how they have been made the dupe of dangerous agitators appealing to their sentiment and sympathies by a perversion or a concealment of the main facts in the case.

It will be found that a group of fanatical anti-Japanese agitators were implicated in a conspiracy whose ramifications extended to other countries and whose dupes and tools occupied exalted diplomatic and governmental positions.

The evidence is officially before the world that the secret Sino-Russian alliance of 1896 found its logical aftermath in the Anglo-Japanese pact: that it opened Manchuria to Russia for the sole purpose of enabling this power to crush Japan: that it provoked and precipitated the Russo-Japanese war, to that date the most terrible conflict the world had witnessed: that its secrecy was so well guarded that even Chinese officials were ignorant of its existence: that China emerged from the conflict as the innocent and injured victim: that notwithstanding her part in an alliance which compelled Japan to make such bloody sacrifices, her sovereignty over her surrendered territories was restored, after it had been forfeited by all the recognized laws of warfare.

American policy in Manchuria has been based on the assumption that Japan was the aggressor, that she had no right to claim a special position after the sacrifices brought about by the secret diplomacy of China. The United States has been brought into the controversy by reason of the note of our government of May 16, 1915, and the wires are now being pulled to have us intervene in the question of the cancellation of the lease in March of next year.

The statement of the highest living Japanese authority is also before the world, and although it convicts him of having been tricked by Yuan Shih-kai, it tells us that the much denounced ultimatum which followed the twenty-one demands was specially requested by the Chinese government in order to save its face before the nation, a secret deal to obtain Japan's recognition of Yuan Shih-kai as emperor of China. For seven years this fundamental and most important evidence has remained a profound secret, and only when faced with the prospect of having the Manchurian lease declared null and void, does the truth come out.

Because of the secret diplomacy of Li Hung-chang in 1896 and Yuan Shih-kai in 1915, the sympathies of the American people have gone out to China, and have been played on to the point where we were to have been railroaded into war.

Mr. Bertram Lenox Simpson, the British high adviser to the president of China, the unofficial head of the Chinese foreign office "in charge of the reports on foreign affairs," confesses to having been sent on a secret and official mission to use his own methods to bring about the cancellation of the Anglo-Japanese alliance, and in pursuit of this object, reveals the plot that was all prepared to make the United States and China allies in the war with Japan. There is no evidence that the details of this plot was communicated to the SUCKERS, but it was fully and confidentially imparted to the premier of Canada, in order to influence his policy at an imperial British conference.

The story is almost complete. It remains for an official investigation to establish the facts and ascertain the identity of the misguided patriots who had so far compromised the nation as to lead the Chinese to believe we would enter into a treaty of alliance and use their ports as naval bases. The Chinese must have had some assurance that we would ally ourselves with them. Who is responsible for this secret diplomacy that would have carried sorrow to thousands of American homes and used the youth of America for cannon fodder to bolster up their schemes? The American ambassador at Tokyo has categorically denied that the American government had any official cognizance of the scheme for the defense of the gulf of Chihli. This statement tells us that the plot was hatched in Peking. By whom?

If the editors of America will make this clear to their readers, the howl of indignation that will go up from end of the land to the other, will force the government at Washington to take steps to ascertain the truth. LET US DEMAND THE FACTS!

* * *

A permanent peace in the Pacific can be firmly established only upon the secure basis of Sino-Japanese friendship. As long as misunderstandings exist between these two great Asiatic nations permitting international mischief-makers to ply their professions in Peking, the United States is in constant danger of being embroiled in war with Japan.

Secret diplomacy, truths half told and partisan propaganda will continue to breed suspicion, engender hate and promote strife. The great work of the Washington conference will count for naught while such conditions endure. The road to Pacific peace, the foundation upon which the stability, development and prosperity of China must be erected, the key to the expansion of foreign trade and the opening of immense markets, is a *rapproachment* between China and Japan.

The first step towards this goal is the recognition by China of her part in plunging Japan into a struggle for her national existence; to that date the most disastrous and bloody war in world history. The frank acknowledgement on the part of China of Japan's disinterested friendship in restoring her sovereignty over her lost Manchurian provinces, is the *sine qua non* to a settlement of the last outstanding point of disagreement between these two nations.

Japan is not the agressor in Manchuria. Japan is sincere in her oft expressed desire to reach an amicable and lasting understanding with China. Japan has no intention to further impair the sovereignty of China in Manchuria, recognizing she is there as a lease holder only. If we interpret Japanese opinion and policy correctly, they are even willing to forego certain phases of the leasehold rights and surrender jurisdiction over Kwantung and the railway zone WHENEVER CHINA PROVES STRONG ENOUGH TO DISCHARGE HER INTERNATIONAL OBLIGATIONS IN THESE REGIONS. Until such time, the mutual defense, the co-existence of both countries demands the presence of a power in Kwantung that will guarantee not only the integrity of China but safeguard the vital interests of Japan. The formula that justifies British occupation of Kowloon and the American-Nicaragua treaty, covers Japan's occupation of Kwantung pending such time as the legitimate owner of the territory can guarantee that her national existence will never again be placed in jeopardy.

American public opinion, American diplomacy and common sense can prevail upon the Chinese to exercise sound judgement and repair the breach in their relations with Japan. Through the operation of a secret diplomacy in which neither the people or the present officials of China can be held responsible, the seeds were sown which ripened into one war. The secret diplomacy of Yuan Shih-kai and the still more damnable secret diplomacy of the Peking Camarilla nearly precipitated a greater one. Only by heroic efforts was this last catastrophe averted. Let us put a stop to conditions which enabled a small clique of misguided foreign enthusiasts in Peking to devise plans of campaign and draft secret alliances which almost precipitated America and Japan into hostilities. American editorial and public opinion, brought to bear on the right quarters in Washington, can do it. It is the only way.

GEO. BRONSON REA.

British Engineering Trade in China and Japan

"The Eldorado of The Far East"

IT is seldom that we tender advice to our British friends in trade matters, but in view of the somewhat strenuous campaign now being carried on in England to induce British firms to establish themselves in China, it may not be out of place to invite attention to facts which are obviously overlooked. From the many newspaper clippings which come to us from London, it is clear that the same tactics are being employed to influence British traders to come to China as were so successful in the similar campaign which flooded Shanghai with over 300 new American concerns two years ago, and whose inexperience precipitated the financial catastrophe of 1920.

It seems to be taken for granted that the road to commercial success in China is to increase the number of foreign firms already in the country, or, to employ the slogan of one of the American boom agencies, "in numbers there is strength: only by outnumbering the others can we hope to succeed. Come on in boys, the water is fine." And the Americans came in with a whoop, wetting their feet first, then walking in deeper and deeper, until they got over their head, went under and rose no more. The old established hongs of Shanghai paid the price for the activities of self-styled trade advisers who had nothing to lose themselves and everything to gain by increasing the number of firms in the treaty ports. It cost the established firms many millions of dollars or pounds for this campaign to pad the Hong Lists.

During the war, when British firms were practically unable to hold their own, there was some justification for the influx of new American firms into the China field, but it stood to reason that as soon as normal conditions returned, the firms not firmly rooted in the country would be compelled to shut up shop. This happened. Now there may be room for many new British trading firms in China, nevertheless, we incline to the belief that until conditions improve and a stable government once more guarantees life and property, any campaign to flood the country with new firms is not only prejudicial to the interests of established hongs, who have a hard enough time as it is, but a positive invitation to further financial disturbances.

Typical of the articles now being printed in England regarding the possibilities of the China market is one in *The Times*, entitled "The Eldorado of the Far East." The writer says that the "China trade is straining at the leash, eager to bound ahead. It needs but a turn of the political wheel, and a little improvement of the general situation, to open out a new and magnificent vista of trade opportunity." After a general *resumé* of trade returns which indicate the extent to which British trade may prosper by paying more attention to Chinese markets, he concludes by saying, "it depends upon the intelligence and enterprise of British traders to make good in this Eldorado of the Far East." The identical catch phrases which lured the inexperienced American trader to ruin two years ago.

It is true that prosperity in China needs but a turn of the political wheel, but the impulse that will make the wheel go round and bring stability to the government in Peking, is a large foreign loan, which may or may not accomplish its object. It is just possible that the hearts of the British investor are being fired to subscribe to the forthcoming Chinese bond issue which British papers inform us is a possibility. There is every evidence from reports in the British press that an independent Chinese loan advanced by groups outside the consortium is meeting with favor, and that considerable dissatisfaction prevails over the consortium pact which has prevented the flotation of a loan to the Wu Pei-fu faction. If the trade boom campaign now being carried on is part of the propaganda to pave the way for the successful issue of such a loan, the British investor might well seek more positive information about conditions here, from firms already on the ground. Although we do not always agree with the Hearst editorials the following from the *New York Journal* of October 2, is not without its significance:—

> "China is borrowing ten millions from bankers at Peking and elsewhere. Out of that the Chinese government will get eight millon dollars. The bankers that float the loan will get TWO MILLION GOOD DOLLARS. The investor will get CHINESE BONDS. It is pleasant for the bankers. They get their two millions, for instance, out of this Chinese loan, peddle out the bonds and THEIR risk is ended. It is pleasant for the Chinese gentlemen temporarily in authority. They get the eight millions, which melt. What about those that buy the bonds? They will get the answer to that later."

At the bottom, the tactics are identical with those employed to enthuse Americans into lending huge sums to the military overlords of China, and now that the American and Japanese group leaders are reluctant to advance these funds to bolster up any particular clique and prolong internal strife, the activities of the loan promotors have been transferred to London. It is possible to completely deceive the public in England as to the real conditions in China as it was in America, provided the boomers are sufficiently high placed and there are newspapers of prestige to publish their

propaganda. Despite the warnings of this publication, the American manufacturer, merchant and investor disregarded its advice and poured into the *Eldorado of the Far East*, and got beautifully trimmed. It cost American firms about $50,000,000 to learn that the China market is no place for unsophisticated griffins. Let us hope that the British trader and manufacturer will not get stung to the same extent, in order to learn an elemental truth that any old retired "China Hand" in London can tell him about.

Our experience in China tells us that British interests are remarkably well served and advanced by the firms already on the ground, and if they have failed to obtain their full share of the orders, it is because of conditions over which they have no control. If British trade, especially in the engineering lines, has declined, it is traceable to the increased activities of Americans and Germans, not to mention the inroads that the Swedes, Czech, Swiss, French and other European manufacturers have made in a market in which before the war they were prominent by their absence. There now exists a fierce competition for the little business that is offering, and at times the British have been unable to meet this new situation. It is futile to assert, as some British writers are now doing, that Americans and Germans have better equipped men on the ground, as we can point to a long list of British machinery firms whose engineers are fully as efficient as their competitors, in many cases experts in their lines, which, added to a long experience in China, gives them a decided advantage over the purely technical representatives of other nations.

In other words, British trade in China has not declined because of inadequate representation or inferior engineering intelligence, but simply because development has been retarded and brought to a standstill as a result of internal political conditions and the chronic inability of the Chinese government to meet its obligations, let alone embark in new construction. Whatever new business has come forward, has, in the majority of cases, gone to their competitors, who are now sitting on the door steps of the Treasury at Peking dunning the minister of finance for payment, while their respective legations are employed as official schroffs. The trade returns may alarm the British analyist who accepts the statistics at their face value, but when permitted to look behind the scenes, he well see that the apparent British loss is in reality a clear gain. They are that much in pocket.

It might also interest British engineering firms and throw light on the situation, to learn that their Chinese railway supply business has diminished in part through the failure of the Chinese government to live up to the spirit of its loan agreements with the British and Chinese Corporation, whose services as purchasing agents have been dispensed with, and in some cases, the business placed through an American firm. All of which may have been strictly according to the literal meaning of the loan agreements, but the British official company certainly was entitled to the preference in this matter, whenever the Chinese elected to make use of an agent for the purchase of materials on the lines involved. Several very emphatic protests were lodged by the British and Chinese Corporation and by the British legation against this ignoring of their rights, but as usual, they received no attention. As much of the equipment that might possibly have been ordered from British manufacturers is still unpaid for, there may be some small modicum of satisfaction in contemplating a loss of business under such circumstances. The London office of the British and Chinese Corporation might throw some light on this matter for the benefit of British engineering groups who feel uneasy over their prospects in China, and turn dejection into gladness.

British Trade With Japan

As in China, so in Japan. The same arguments are employed in the British press to explain away the loss of their trade with Japan in engineering supplies. A typical article of this nature is found in the editorial columns of *The Engineer* of October 13 ulto. The facts surrounding the situation are set forth as follows :

"If any English engineer will take the trouble to turn to a report on the commercial, industrial and financial position in Japan in the year ending June 30, 1921, recently issued by the department of overseas trade, he will be struck by two facts of much consequence to himself. In the first place, he will perceive that whilst in the years immediately preceding the war the United Kingdom supplied Japan with 40 per cent. of her requirements in iron and steel, in the year 1920 the proportion had fallen to 23 per cent. On the other hand, America in the same year increased her 15 per cent. to no less than 75 per cent. of the total requirements of Japan in iron and steel in the same year. That is a striking and uncomfortable contrast which cannot be lightly explained away, for it is confirmed by other figures for the total commerce of Japan with foreign countries. Before the war the United Kingdom enjoyed 31 per cent. of that trade and in 1920 that figure had not altered, but the United States, which used to stand second with 22 per cent., had advanced to the first place with 33 per cent. This increasing influence of America in the trade of Japan is the first fact that will strike the reader. The second is that at the time this report was written the influence of Germany was so small that it receives no attention at all—there is no mention whatever of the efforts of the Germans to re-establish their trade with Japan. At first sight, this might appear to be a matter-for congratulation ; but it is, indeed, just the opposite. Germany is now energetically at work in the Far East, with the result that we have not one active competitor to face, but two. In China the same competition has to be met. The position of the United Kingdom is no longer unchallengable. The United States and Germany are making every effort to undermine it, and nothing but a campaign carried on with all the energy we can command will prevent the repetition in China of the condition exhibited by the figures for Japan which we have quoted above."

In seeking for the causes of a state of affairs which gives rise to British uneasiness, *The Engineer* is inclined to give undue prominence to the current criticism that British engineers are not up to the high standard of efficiency and deportment that characterize their competitors, and concludes by saying that :

"If British firms neglect this policy, if they leave it to America and Germany to be represented in China and Japan by the best men, if those countries become habituated to turning to our rivals for technical help, then we shall unquestionably see a trade, which has already sadly fallen, diminish further, and the splendid reputation for engineering which this kingdom has enjoyed in the East will dwindle away."

It is with no desire to be controversial that we inject ourselves into a discussion that is purely a British family concern, but we feel warranted in inviting the attention of British engineers to the working of a fundamental economic law which seems to have been overlooked in seeking for the reason of their trade decline with Japan. It is axiomatic that a manufacturing nation who consumes the larger part of the exports of another nation is in the most favorable position to supply its imports. This explains why British machinery has been displaced to a large extent by American equipment in Japan. The world war brought great changes in old established trade conditions, and as a result America and Japan were brought into a very intimate commercial relationship. To quote the above figures, America's total trade with Japan in 1913 was only $150,000,000 : in 1921, it reached $550,000,000. American imports from Japan in 1922, largely raw silk, approximated $300,000,000 while our exports to Japan, largely raw cotton, were valued at $245,000,000. In the interchange of these staple commodities, Japanese firms to the number of seventy, established offices in New York city, with all the most up-to-date commercial machinery to assist them. Six Japanese banks, several insurance companies, and steamship lines, a special financial agent of the Japanese government, purchasing offices of the government railways, the army and navy departments, the South Manchuria Railway and other concerns have established offices in New York city. It is natural that they should place their orders for machinery and other requirements in the country whose trade makes these purchases possible. For instance, as noted elsewhere in this issue of The Far Eastern Review, the great Mitsubishi firm alone purchases annually over $50,000,000 of American products through their New York office. It is difficult to change this situation as the mainstay of their business is the buying and selling of the two great staples. The rest follows naturally. The situation is somewhat similar to that which gave to British trading firms their pre-eminence in the Chinese engineering field. The prosperity of old established hongs is based primarily on the interchange of staple products and their engineering departments were built up on this solid foundation of trade which enables them to weather through when other engineering concerns are hard hit. As long as this close trade relationship exists between Japan and America, it seems natural that American machinery manufacturers will remain in the most favored position to supply Japan with the greater part of her engineering requirements. The perfect understanding that

exists between Big Business in both countries will undoubtedly strengthen the bonds of friendship as the years go by and make it increasingly difficult for other nations to compete. The foregoing explanation will help also to explain why the principal financiers and captains of American industry determined in 1919 to use all their influence to check the agitation to precipitate war between the two countries.

These, therefore, are the basic reasons why British engineering trade with Japan has decreased from 40 per cent. of the total in 1913 to 23 per cent. in 1920 and why America increased her 15 per cent. to 75 per cent. of the total in the same period. It is no reflection on the quality of British material or the ability or social qualifications of their engineers. The British engineer in Japan is simply up against the operation of a fundamental economic law that no amount of propaganda can offset. On the other hand, it speaks volumes for British enterprise that their agents and engineers in Japan have been able to secure some of the most valuable orders in the face of a situation which gives to their American competitors such a favorable advantage.

If the bulk of the business has gone to the United States, it should be borne in mind that the great majority of these orders are placed direct with American manufacturers through the New York offices of the large Japanese firms, who, by reason of their huge purchases, intimate connections, and knowledge of market conditions are enabled to obtain the lowest possible prices and assure quick dispatch and facilitate financing. When viewed from this angle, it would indicate that at least fifty to seventy per cent. of the engineering business of Japan is of a nature that precludes general competition on the ground and automatically sends the inquiries and orders to New York. This also a situation over which the British engineering representative in Japan has no control.

G. B. R.

The Fatuous Policy of the Chiaotungpu

(Contributed)

THE Chinese government official has always been credited with a somewhat superior skill in the conduct of machiavellian policy and with a thorough knowledge of the psychology of the hapless "stupid people" under his control. If this is still a general rule, the officials now responsible for the railway policy of the government are most woaful exceptions. In the recent labor troubles they utterly discredited the one government department able to boast a policy not entirely opportunist.

In the past, this department learnt a costly lesson in the futility of listening to popular clamor raised in defence of national integrity over the question of the Hangchow-Ningpo railway loan. With the streets of Peking and their bigger cities furnishing occular evidence of the degradation of Russia as a result of the adoption of Bolshevist ideals, the railway officials now yield to a mob infected with the same dangerous principles, and making demands which will have consequences infinitely more far-reaching.

Labor so abysmal in its ignorance was bound to misinterpret an easy victory, as the Chinese official of experience was well aware. Compromise is the immemorial basis of settlement of all disputes in the East, and demands are framed in expectation of it. Yet no attempt was made at compromise. Labor's demands were conceded practically *en bloc* with the inevitable result that more demands will be made. Such a victory teaches nothing, and only breeds arrogance in the ignorant.

As a result, the government which should do its utmost to encourage and protect private industry, has involved the employers of North China in a labor war which threatens their existence. The government, already sufficiently harrassed financially has now to meet a vastly increased expenditure as a result of granting these ridiculous demands. Lastly, such a policy can only end in bankruptcy and control of the railways by foreign creditors, a result doubtless to the benefit of the nation as a whole, but entirely opposed to the ideals of a government always highly sensitive on the subject of national integrity.

On every count, domestic and foreign, the recent policy of dealing with Chinese labor was utterly mistaken. A parade of the forces of law and order, insistance upon immediate return to work with a promise to consider the grievances as represented by delegates, imprisonment for the agitator, who, not from conviction but for a price, teaches a people mentally blind, as yet, to cry for a moon they cannot even see; these should have been the measures adopted for calming the first outbreak of industrial unrest in the North. Had these expedients failed, as assuredly they would not, there remained the application of armed force for the intransigeant minority who would ruin China far quicker even than the rival oligarchies, and their hordes of drone soldiery. The only satisfactory aspect of the present situation is that China is industrially an infant, and may perhaps, as a result of this colossal blunder, advance a step in that hard school of education to which national conceit condemns her. There is, however, even a doubt about this, for China's memory for the really vital, and educative pages, of her history is about as short as her memory for monetary or moral obligations.

Apart from this vital question, there is an apparent slackness in the conduct of the railway department of the board of communications. Presumably those who direct its affairs fail to study the very comprehensive report, the yearly *chef d'œuvre* of the department. If the statistics for the years 1916 and 1919 are contrasted they will provide unpalatable reading for those who stridently aver that China has now reached a stage of self-sufficiency in all things. During the four years considered, the annual increase in kilometreage was 134 kilometres. This in itself, is a singularly poor record for a country whose existing main lines are in urgent need of development, quite apart from the crying need of better communications generally. Such building as is done gives no indication of a systematised development of the trunk system; there is no yearly program, not even the farce of its discussion. Years of war and lack of funds, will be advanced in extenuation, but surely with a surplus running as high as 30 million dollars, something may be snatched for systematic construction not limited by the strategic ideas of tuchuns or the official with capital to invest.

Again, it will be found that train density in the years considered has remained stationary at 11. Therefore the added kilometreage should call for no practical increase in personnel as regards the traffic and locomotive departments. The engineering department, taking the very high figure of four men per kilometre, would account for an additional 2,160 men for the 540 kilometres increase in the four years considered. Yet it will be found that the number of railway employees increased by 13,794 in the years 1916 to 1919. The railways are then in need of the economising axe, most urgent in these lean years. It might be advanced that increased rolling stock demands an increase of employees, but wagons per kilometre in 1916 stood at 1.92, in 1919 at 1.88, while locomotives were 0.116 and 0.115 in these two years, a condition indicating a practical *status quo*, and at the same time advertising the poverty of equipment as contrasted with railways elsewhere in the world. Thus two of the Indian railways were equipped in 1918 as follows, and they carry a rather less tonnage than the Chinese lines :—

	Engines per k.m.	Wagons per k.m.
Bengal Nagpur.. ..	0.17	5.0
Bombay Baroda ..	0.18	4.4

Again, for the benefit of those for whom figures have no appeal, and for those who will have it that statistics may be made to prove anything, I would present the following facts. At two ports in Northern China may be seen piled up in the manner of a railway accident the parts of some four hundred cars. These have lain there at least a winter and a summer, detained, it is said, for non-payment of duty, more probably deposit default to the makers. Originally, these parts were in packing cases. The cases, however, have a past and a future as fuel, while local brass founders and blacksmiths will surely not overlook the more portable plunder in these forgotten and unprotected heaps. With the urgent need for rolling stock, what can be said of railway management which allows such things, especially when it is considered that every ton of car capacity in these dissolving rusting heaps, is capable of earning a yearly income of at least 168 dollars per annum.

Again, as applied to the question of improved communications generally, it is pertinent to ask whether any steps have been taken to metal the 800 odd miles of roads presented to the country by the American red cross, or whether these have been left uncompleted to the tender mercies of the Chinese country cart which will rapidly deprive them of potential utility. Also, in this connection, one wonders at the apathy of a government which still abandons to almost yearly inundation a considerable portion of northern Anhui for lack of reclamation and conservancy work of the Huai River, which in the long run, would prove a source of income.

It would thus appear that the publication of expensive railway reports only serves at present to lay bare ineptitude, and to demonstrate the fact that revenue is increasing at a somewhat greater rate than extravagance; a fact worthy of consideration to a government in pressing need of money.

Reverence for the past and its traditions is accounted a national trait. Those now controlling the board would do better if they turned again to the old wisdom for guidance as set forth in such pithy proverbs as: "The error of one moment becomes the sorrow of a whole life." "Those who cannot be unheeding sometimes are not fit to rule."

Something of mob psychology might have been learnt from the following sayings:—

"A vacant mind is open to all suggestions as the hollow mountain returns all sounds."

"Better be a dog in peace than a man in anarchy."
"To obtain one leads to asking for two."
"Good fortune is a benefit to the wise; a curse to the foolish."
"To stop the hand is the way to stop the mouth."

Lastly, for the benefit of the iconoclast young man who tends more and more to assume responsible positions in the government, I would quote, "who swallows quick can chew but little," and assure him that the present conduct of affairs will not bring about that eminently desirable state which is summarised in the saying "no duns outside, no doctor within." In mitigation of their undoubted deficiencies, it may be advanced that the Chinese cabinet minister is no sooner in the saddle than he is out of it that he is blinded and deafened by the perpetual crash of falling ministries and the bustle of their re-constitution. Then let him hearken to the hoary old saw which decrees that "The onlooker is often the best judge of a game." There is criticism enough in all conscience. The past has provided adequate guidance and this wisdom is in the mouth of every educated Chinese. Long live the past!

Vast Water Works Extensions in the Far East

Manila and Singapore to Increase Water Supply

IN line with harbor and public utility improvements throughout the Far East, the expansion of existing water works is being taken up in all the principal cities of the Orient. From Tokyo to Singapore plans are being drawn for large water supplies for the various important centres and the near future will see several large projects sanctioned and started. In our October number appeared articles on the Osaka and Hongkong expansion schemes and we have since received reports on the programs for the extensions of the Manila and Singapore water supplies.

The Manila Project

The urgent necessity of an increased water supplur system for the city of Manila was forcibly brought out by A. Gideon, manager of the metropolitan water district, at the weekly luncheon of the American chamber of commere of Manila on Wednesday, October 25. Mr. Gideon has been connected with Manila's water supply and sewer systems for 19 years and is the father of the metropolitan water district.

Mr. Gideon briefly traced the development of the Manila water supply system. About 200 years ago a Spanish general by the name of Carriedo left P.10,000 in a trust fund to be used for water supply purposes. By 1880 this fund had grown to P.200,000. despite the serious drafts that had been made on it by none too scrupulous people. A project was finally decided upon after ten years of investigation and it was found that it would cost P.1,200,000. To raise the extra money a tax on milk was instituted. Finally the pumping station at Santolan was installed with two pumps. When the Americans came, two more pumps were added. This system yielded 5,000,000 gallons daily, but was soon found to be inadequate.

In 1900 the city of Manila utilized its whole borrowing capacity of P.8,000,000 and constructed the present water supply and sewer system. This system, with its dam at Montalban, should be capable of impounding an immense quantity of water, theoritically, but, unfortunately the limestone of the reservoir basin is leaky and two years after the reservoir was filled up a leakage of 27,000,000 gallons a day was discovered. Since then many of the seams have been tightened up and other remedial measures have been taken, so that the loss has been reduced to 9,000,000 gallons daily.

Mr. Gideon stated that he has been urging a new source of supply since 1911. In 1918 he went direct to the governor general and outlined the metropolitan water district, so-called because it is not only designed for Manila but for all the neighboring towns. In 1919 the district was established. Up to then the water supply had been run at a nominal profit but at an actual loss of between P.250,000 and P.500,000 a year, the discrepancy being due to faulty accounting methods. The district had no funds in the treasury at the start. A credit of P.500,000 was, therefore, authorized for operating expenses. This money was not touched and there is P.1,000,000 in the treasury to the credit of the water district.

Mr. Gideon maintained that the number of water services is an accurate index to the prosperity of the city. He presented the following figures in this connection:

Year	*Services*	*Income*
1903	2,000	P.200,000
1918	8,000	625,000
1922	14,000	1,250,000

Mr. Gideon was very emphatic in his advocacy of a new system and declared that he hated to contemplate the possibilities of the

next dry season or the one after that unless additional provision for water is made.

Three projects, he said, have been under consideration. The first is the development of the present Montalban reservoir. This, however, is impracticable on account of the impossibility of making the basin watertight. The second, in the Boso-Boso watershed, would require the construction of two large dams and the building of a new pipe line. Its costs would be about P.13,000,000. The third, and the one most favored, is that of the Angat river in Bulacan province. It would necessitate the construction of a low dam, only 50 feet high, and the water would be brought to the city by tunnel. The capacity of this project would be 80,000,000 gallons a day, which ought to take care of Manila's needs until 1980, according to Mr. Gideon. Manila is using about 2,000,000 gallons a day now. Mr. Gideon has worked out a practicable financing scheme for the Angat project. He is opposed to a hydro-electric development proposition in connection with the latter on account of its exceessive cost.

Although this proposed extension is still in the air, there is little doubt that necessity will compel the adoption of some plan in the near future which will assure to Manila an adequate water supply.

Gunong Pulai Water Scheme, Singapore

At meetings of the Singapore municipal committee No. 6 held on October 9, 13 and 18 it was resolved to recommend

(A) That Sir Alexander Binnie, Son and Deacon's report on the Gunong Pulai water scheme for supply of 6½ million gallons per day be adopted.

(B) That Sir Alexander Binnie, Son and Deacon be appointed consulting engineers for design and construction of the scheme at a fee of £97,500, covering a period of six years from date of furnishing of drawings and specifications, the said firm undertaking to keep one of its partners in residence in Singapore.

(C) That the commissioners agree to Col. Pearson, engineer-in-chief, ante-dating the termination of his agreement with them from November, 1923, to August to September, 1923, with a view to his entering into partnership with Sir Alexander Binne, Son and Deacon and to his undertaking on behalf of that firm the duty of consulting engineer in residence.

This scheme as noted above, will produce 6,500,000 gallons of water per day at a cost not greater than £1,650,000, and we find here a duplication of the difficulties surrounding the colony of Hongkong in securing an adequate supply of water within the confines of its own island. As Hongkong is forced to seek its future supply from the main land and have it piped under the harbor from Kowloon, so Singapore must also go across the Johore Strait for its water, and for this reason the Gunong Pulai scheme is recommended as the only solution to Singapore's problem.

Commenting on this scheme, the *Malaya Tribune* says that "Such an increase looks substantial, but let it be remembered that the present position is "precarious," and that within quite recent memory an unusually prolonged absence of normal rainfall brought a water famine within uncomfortable distance. Actual daily consumption in 1921 was 10,057,000 gallons, and that quantity was in excess of maintainable yield from existing sources. In other words, shortage of supplies was only averted by a providential rainfall which it was not safe to count upon.

Turning to the future—and remembering that over ten million gallons were consumed daily in 1921—let us consider the prospects. Basing conclusions as to increase of population and of water consumption on calculations which experience has shown to be reasonable, by 1951—29 years from now—three will probably be a population within the Singapore water area of 658,200 (compared with the 333,266 of 1921); that is, the population will have nearly doubled. Allowing 35 gallons of water per head per day, the consumption will then be 23,037,000 gallons daily; allowing 40 gallons per head, it will be 26,328,000 gallons. And whilst Colonel Deacon thinks that 37 gallons is a sufficient daily allowance per head of population (the 1901 figure was 21.7, the 1920 figure 32.9), the points out that the increase shown in the past few years is due both to greater domestic use and to trade development.

With the Gunong Pulai supply duly available—and Colonel Deacon insists upon the urgency of commencing operations to make it available as soon as possible—"there need be no anxiety for many years to come"; and his opinion that this is the most economical of the several schemes put forward commands respect.

* * *

Looking Ahead a Quarter of a Century

Russo-Germanic Designs in Europe and Asia

ONE of the most influential publications of the United States is *The Manufacturer's Record*, of Baltimore. It reflects the sentiment of the great commercial and industrial interests of the Southern States, whose prosperity is closely interwoven with that of the great British textile industries. After reproducing the gist of the editorial entitled "Up to Northcliffe," published in the July issue of THE FAR EASTERN REVIEW, *The Manufacturer's Record* says:

"*The North-China Daily News* has an uncanny habit of unearthing documents disclosing the inner working of Russian policy in Asia. Many years ago it set the chancelleries of the world agog by publishing the text of the Cassini convention, a document which changed the whole aspect of Asiatic politics and compelled Great Britain to move quickly in order to defend her interests in India and elsewhere in Asia. The aftermath of this convention and its corollary, the Li-Lobanoff secret alliance between China and Russia, was the Anglo-Japanese alliance, the Russo-Japanese war and the series of events which culminated in the twenty-one demands followed by the diplomatic blunders which nearly precipitated war between Japan and the United States.

"Once again our contemporary publishes an epoch-making document, purporting to be the full text of the secret military convention between Soviet russia and republican Germany. As in the case of the Cassini convention, the authenticity of the document is in doubt, but it bears the earmarks of truth. In the event of its authenticity being established, history will undoubtedly repeat itself and Great Britain again make quick moves to counteract it, and unless we are greatly mistaken, the first of these will be a renewal of her discarded understanding with Japan.

"By the terms of this secret agreement, Germany will equip, arm and entirely reorganize the Russian army. The German general staff will furnish the red army with the latest inventions in poison gas warfare, will build and equip new munitions and air craft factories, *and the reds are not to interfere with the work of German officers and specialists on the new munitions factories on the border of Afghanistan.*

"No competent observer can fail to see that the reported secret convention is the logical aftermath of the Soviet's first surrender to Germany, and is strictly in line with the news that has dribbled out of both countries for the past three years."

"The information given in the foregoing from THE FAR EASTERN REVIEW is now confirmed by dispatches from Europe, which show that not only have Germany and Russia entered into a treaty, but that Tu key is included in the deal."

"Mr. Moreton Frewen, the well-known political economist of England, sends the *Manufacturer's Record* an interesting letter from Lieut.-Colonel Repington in which attention is called to the fact that the Russo-Turkish alliance of last year has been followed by the Russo-German treaty, and that the known tendencies of Austria, Hungary and Bulgaria compel England to recognize the solidarity among its lately vanquished enemies, and a clearly defined intention of bringing about by successive stages the revision if not the destruction of the peace treaties with the aid of the Soviet government of Moscow."

"Colonel Repington says the Bolsheviks, prompted by Germany, and the Kemalists in second place, recognized early the leverage which they might exercise against the western powers by an appeal to Mohammedan sentiment throughout Mohammedan regions, and they left no stone unturned to excite against England, France and Italy, the Mohammedan people under their sway. The propaganda has been carried on for three years in the allied countries or their dependencies, and everywhere in the underground workings has been seen the hand of the Soviet.

"The Germans wish to bring back the Turk into Europe in order to revive for their benefit the old war combination. The Turk once in Europe, the designing Germans, as admitted by Von Sanders, count on the 26,000,000 Mohammedans of the world to keep the western allies fully employed in protecting their own possessions.

"It is not," says Colonel Repington, "a program for to-day or to-morrow, but for a quarter of a century ahead."

"The congress of Oriental peoples which is to meet next year under Kemalist patronage is part of the picture and it will endeavor to unite all the Orient against the west in a common front, a consummation to which the Germans are looking with great satisfaction. Turkey is to serve as a link between Germany and the whole of Asia. Turkey can count on Russian support as Russia can count on Germany. Those who have traveled through Eastern Europe of late find the indications of this great conspiracy wherever they go."

"Colonel Repington's letter illustrates in considerable detail the meaning of this situation to England and France, and no American study the outlook without feeling that the world is coming to a parting of the ways between civilization and barbarism, and the struggle will be whether barbarism or civilization shall survive.

"One of the best informed and most far-seeing educators in England in a personal letter to the editor of the *Manufacturer's Record* says: "Things are moving on apparently to a vast cleavage between the Christian and Mohammedan worlds. I wonder if Americans know the appalling things that happened at Smyrna. The Turks are just raging to get over the Bosphorus and get after Christians."

"Lloyd George in his address rightly stated the case when he said that England had stood in the breach to save Europe from the onrush of the Turks. Standing thus England has perhaps for the time being saved all European civilization, for if once the Turks can re-enter Europe in power, the rise of the Mohammedan world against Christianity will stagger the world with the awful carnage, of which only the barest hint seen in the destruction of Smyrna. What the Turks did to that city and to the tens of thousands of Christians gathered there, they are longing with a blood lust to do to all of Europe.

"The Almightly alone can see what is ahead of the world, but in the light of this situation disarmament of America or of England would be a crime against humanity and Christianity itself."

* * *

Will Wood "Come Back"?

THE elections on November 7 may be considered as a republican defeat, a disapproval of the present administration forcibly expressed by the American people. It is doubtful whether this reaction is traceable to the republican party's handling of domestic problems or to its foreign policy. The democrats, arraying themselves for the struggle in 1924, have fiercely attacked the foreign policy of Harding and Hughes characterizing it as "supremely foolish" and "a record in foreign affairs of almost unparallelled stupidity," basing their denunciations largely on the failure of the present administration to enter the league of nations. The democrats say that "two years ago the moral influence of the United States was supreme in the world: it was universally recognized that the United States had entered the world war for altruistic and not selfish motives. With the election of Mr. Harding that influence was withdrawn." According to the democratic arraingment "the recrudescence of the militaristic spirit in some quarters of Europe, the existence of large armies, the difficulties of the reparations question—all these things, with their inevitable blight upon the trade of the world, are the direct results of the foreign policy of the present administration."

It begins to look as though the democrats will drag the league of nations issue into the next campaign and lay to the door of the republicans all the woes that have befallen the world and the United States for Harding's failure to adopt the policies of Wilson. The democrats overlook the all important fact that although the last administration may have settled the affairs of Europe to its own satisfaction, it was committed to a program in the Pacific, taken adrantage of by international mischief-makers, which would have plunged the nation into war with Japan.

From this horror the republicans have saved the country and permitted it to retain the leadership in world affairs. We may have lost a certain amount of so-called moral prestige because of our refusal to play the rôle of Don Quixote, but on the other hand we would have emerged from a war with Japan bankrupt in finances and once more in a position where our moral leadership would have carried little weight amongst nations whose policies are diametrically opposed to our own. Our moral prestige would not have carried us far in the councils of the league of nations were we shorn of our financial supremacy and the power to back up our opinions. That the United States is still reckoned with as the strongest power in the world is due, not to the Wilson administration, but to the common sense of the republican leaders shouldered with the task of finding an honorable solution to Pacific problems inherited from their predecessors in office.

We give full credit to Harding and Hughes for the admirable manner in which this solution was sought and applied at the Washington Conference, but we also incline very strongly to the belief that their success was made possible in a large measure by the full and frank conversations between General Leonard Wood and the Japanese military leaders in Tokyo in which each side made known their irreducible terms of compromise. Harding and Hughes are entitled to the credit for this great epoch-making event which brings peace to the Pacific, but nevertheless, it was the cold, hard, manner of fact talk between fighting men seated around a table which made its success possible.

Affairs in Eastern Asia are rapidly approaching a crisis.

Leonard Wood has already done great work in the short time he has been in the Far East. He will be called upon to do greater things before his mission in the Philippines is completed.

* * *

Japanese Sewage Systems

OWING to unusual local conditions, the cities in Japan have been slow in arranging for the installation of sewage systems, but reports coming to hand now indicate that Japanese cities will follow occidental practice in these matters. The Japanese premier has approved the proposed program for sewage improvement for Osaka. This sewage system will handle both rain water and foul water, conducting it to cesspools, which will be fitted with pumping equipment to discharge the whole into rivers or canals connecting with the sea.

The problem involves a very considerable installation, which has been carefully designed and involves the placing of pipes, the construction of cesspools, and the installation of pumping equipment. It is anticipated that 40 per cent. of this work will be done in the Japanese fiscal year 1922, a further 40 per cent. in 1923, and the work completed in 1924.

In Memorium

General Luke E. Wright

"The Father of THE FAR EASTERN REVIEW"

GENERAL Luke E. Wright, ex-secretary of war, former governor-general of the Philippines and first American ambassador to Japan, passed away at his home in Memphis on November 16, after an illness of several months. The name of Luke Wright will loom large in the annals of American penetration into the Orient. When the historian takes up his task, upon no pages will his pen dwell more extensively and approvingly than upon those recording the acts of the man, who stood at the helm of the insular administration during its difficult formative stage, the target for bitter attacks from those who endeavored to prolong the "Days of the Empire"; who subsequently carried to the court of the Mikado as our first ambassador the assurance of American goodwill, and afterwards filled the post of secretary of war in Roosevelt's cabinet where he continued to preside over the destinies of the islands and keep his finger on the trend of international developments in this part of the world.



General Luke E. Wright

General Wright gave a deep study to Philippine and Far Eastern problems, and on reaching a conclusion adhered to it during his stay in the islands. He felt that the archipelago was practically a virgen field, that the possibilities for development along commercial, industrial and agricultural lines were almost limitless. He was early convinced that the islands needed commercial, industrial and agricultural regeneration, and that a brilliant future awaited American trade in the Orient as a consequence of our occupation of the islands and the operation of the "open door" doctrine, recently proclaimed. In carrying out his basic ideas for the development of the islands and expansion of American trade and prestige in the Orient, THE FAR EASTERN REVIEW became a part of the program.

The liberal support tendered to this publication by the Philippine commission over which he presided made its growth possible and contributed largely to its success. THE FAR EASTERN REVIEW was founded in 1904 with the cordial support of the Philippine Government in order to give publicity to the material progress and commercial opportunities of the Philippines, to defend American aims, ideals and policies in the Orient and advance American trade in a field at that time dominated by a press, if not hostile, at least unsympathetic to our national aspirations. Much of its success is due to the initial whole-hearted support of Governor-General Wright and his successors, Ide, Smith and Forbes, over a period of years during which American firms in the Orient were conspicuous by their absence, and there were no commercial attachés, trade commissioners or chambers of commerce to carry the load of advancing national interests.

THE FAR EASTERN REVIEW has never willingly departed from the policies laid down by its original sponsors, whose sympathetic interest, guidance and confidence enabled it at all times to accurately interpret American ideals in the Orient and give a square deal to all other national interests in this complex and highly competitive field. THE FAR EASTERN REVIEW cheerfully acknowledges its debt to Luke Wright and his colleagues, and our most cherished compensation for the years of hard, uphill pioneering is the remembrance of his words of praise when last we met in Washington.

Space forbids the enumeration of the many excellent laws all tending to improve the material condition of things in the Philippines, drafted and put into force during his term of office. Always modest, self-effacing, generous, kindly and truth-loving, he will be remembered by those whose destinies were in his hands for many years and mourned by those who had the rare good fortune to work with him and be honored with his friendship. He represented the highest type of the fine, old, courteous southern gentleman; a type that is fast disappearing. The nation is the loser.

General View of Exterior

The New Kailan Building at Tientsin

THE new headquarters of the Kailan Mining Administration at Tientsin now nearing completion, is one of the finest examples of foreign architecture in China. It was designed by Mr. B. C. G. Burnett, the Tientsin representative of the well-known firm of Atkinson & Dallas, Ltd., in competition with several other architects. The contract for the erection has been carried out by Mr. Hong Mow-kee, a prominent Chinese builder of Shanghai, who has had special experience in the use of artificial stone such as is used for all the face work of the new structure.

The new offices form a rectangular pile 220 feet long and 120 feet deep with four stories aggregating some 70 feet in height, faced in artificial grey granite.

Mr. Burnett has adopted the Neo-classic style, and indicates Roman influence in the treatment of the main floor windows but, in the final plans, this has been eliminated by the adoption of square, mullioned openings, leaving the style throughout purely Grecian.

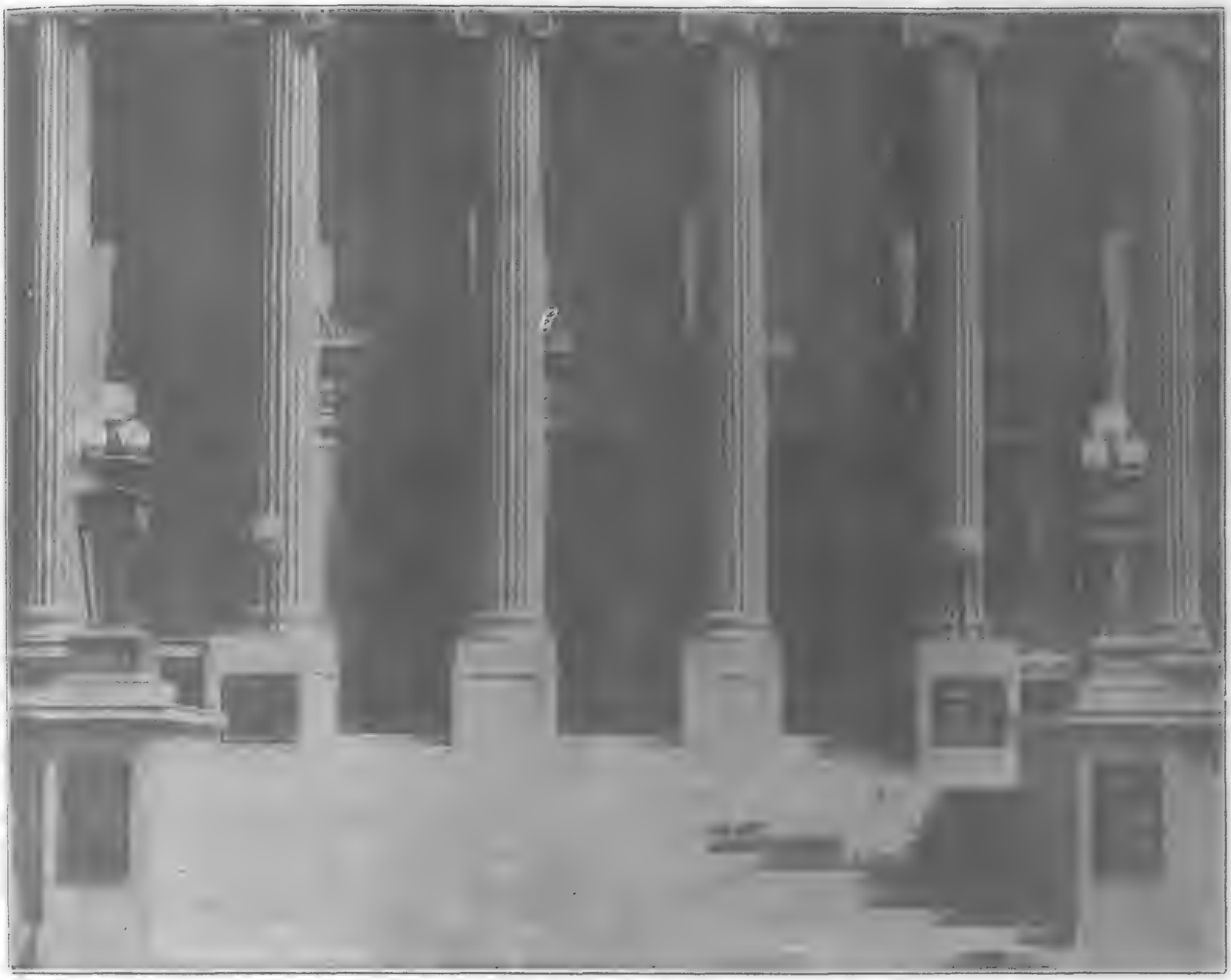
The main facades consist of colonnades Ionic columns on pedestals rising clear above the terrace, surmounted by an attic order. Boldly displayed on the main frieze is the administration's title and the year of construction in Roman numerals fashioned in bronze. The main entrance occupies the three central bays of the Meadows-road frontage and is approached by a broad easy flight of the steps in natural granite which lead to the vestibule through treble swing doors.



The Main Hall, looking towards the Cashier's Grille

All the floors and the very extensive flat roof are connected by two electrically-driven six-passenger elevators. The hot water heating is from a two-unit installation deriving its power from small boilers of the Lancashire type: the treatment of sewerage by the modern septic process; the expulsion of all waste water and sewerage by pressure through a metal pipe communicating with the river and the use of the most modern appliances for ventilation, signalling and electric lighting.

The total cost of the construction of the head offices is approximately half a million dollars, exclusive of the value of the land.



The Kailan Head Office at Tientsin: Main Entrance, Gates Open

Private Railways in Japan

PRIVATE railways operating in the country districts are becoming more and more important as feeders to the main lines of the imperial government railways. The government is to-day busily engaged in perfecting the trunk lines, and is willing to leave the building of the important lines tapping the agricultural, forests and mining centres of the interior to private enterprise, which in the long run, as they prove profitable to their initiators, will be nationalized.

Between 1911 and 1921 the length of private railway lines, excluding double tracking, increased 200 per cent. The capital invested in private railway comhanies in the same time increased from four to five times. Lines opened to business increased by 3½ times, and at the end of 1921 the mileage of private railways was equal to 30 per cent. of the total mileage of the national railways, the latter operating 6,728 miles, the former 2,138 miles.

Ten years ago the mileage of private railways was only 12 per cent. of that of the government railways, 605 miles against the government's 5,000 miles. The following table shows the details of the development of the private railways from 1911 to 1921 :—

	1911	*1921*
No. of railway companies	142	245
Mileage licensed	2,453 miles	4,519 miles
Lines open	605 ,,	2,138 ,,
Capital invested	Y.131,542,085	Y.632,422,255

During the past ten years the quality of the equipment of the private, or light, railways has been remarkably improved. Ten years ago the railways and their equipment were distinctly primitive, and the standard of rails and carriages was very light. Costs of construction per mile averaged in 1911 only Y.5,400. to-day this cost has increased to an average of Y.140,000 per mile. Even allowing for the increased cost of all materials and labor, this great advance in the cost of construction per mile is almost entirely due to the great improvements which have been made in the equipment of the old lines, and in the higher standard of equipment adopted by each new line built. The light rails of ten years ago are practically all replaced with heavier makes, and as a result the tonnages carried by the private railways have been steadily increasing. Steam lines are to-day being gradually converted into electric power systems.

(*Continued on page 745*)

Tienposhan-Tumen Light Railway

THIS long talk of light railway connecting the Tienposhan Silver Mines with the Tumen river in the Chientao district of the province of Kirin, is being pushed to completion despite the protests of the Peking authorities who refuse to recognize the concession signed by the ministry of communications and the subsequent contract entered into whit Chang Tso-lin. Like every other enterprise in China it has encountered the stubborn opposition of the native gentry, who profess to see in it a surrender of sovereign rights to Japan and who have used every method of obstruction known to the Chinese to prevent work being started on it.

The Tienposhan Silver and Copper Mines are located in the Chientao district, ten miles southwest of Laotoukou and are operated under a concession held by the South Manchuria Development Company (Tahsing Company) a Sino-Japanese enterprise which has erected a refinery and smelter and made considerable progress in development work. In order to facilitate the transport of ore and metal to the coast, a light railway line, 80 miles in length, was projected that would connect the mines with the Tumen river. At the same time, such a line would also have an immense strategic value in the event of any attempt on the part of the reds to re-open the old issues with Japan in Manchuria, and could ultimately be made to form part of the proposed Kirin-Kwanei Railway for which Japan holds the concession from the Chinese government. Aside altogether from its economic significance, events are transpiring which justify Japan in her determination to push through the work and hold the Chinese to their signed agreements.



Tienposhan Silver and Copper Mine

The project for the construction of this line had its inception in 1915. According to the Chinese version of the intrigues surrounding the concession appearing in the *Peking Daily News*, a Japanese subject named "Fan-tien-yen-ta-lan" signed an agreement with a Chinese named Wen Lu for the formation of a Sino-Japanese company with a capital of Y.2,000,000. A set of regulations of 15 articles was fixed, and the sanction of the Chinese government obtained through the influence of Wen Lu. Investigation, however, indicated that Wen Lu was employed by the Japanese to use his name in dealing with the Chinese officials. The ministry of communications appointed delegates to inquire into the matter, and having satisfied itself with the fact that it was not a *bonâ-fide* Sino-Japanese concern, the permit was cancelled on the 23rd December, 1919. It was recognized that there was no necessity for the construction of the line, as it would run parallel with the Chi-Huei line, besides many other reasons. However, the Japanese did not stop work and last year began construction on a large scale. The Chinese again raised objections, as there was no Chinese share in the Company, and the ministry of communications again appointed delegates to investigate. It was discovered that there was not a single Chinese share in the company, and that, moreover, the mines at Tienpaoshan had stopped operations for a period of more than one year.

Fearing that the result of the above-mentioned investigation would cause them to stop construction work, the Japanese employed a certain Hsu To-yu, secretary of the Company who styled himself representative of the Chinese shareholders, to proceed with large funds to Holunghsien and Yenchibsien to enlist the assistance of the gentry there, who have ever since been styled as Chinese shareholders and who will be entitled to a certain amount of dividends without paying a single cent for their shares. Last April the Japanese began again to construct the line, and the students and merchants at Yenchi and Holung made a demonstration during which the Chinese shareholders were severely beaten. The Japanese published false reports stating that the movement against the construction of railway was engineered by Chinese connected with the independent party of Korea. Consequently the Japanese consul demanded the extradition of these two gentlemen, who went to Peking to obtain protection and redress. In July when President Li Yuan-hung was reinstated and parliament restored, Messrs. Li and Wen began to show the cabinet, parliament, the ministry, etc., the aggression of Japanese in their native district; and the government telegraphed to Mr. Tao, taoyin of Yenchi, instructing him to come to Peking to discuss the matter. At the same time General Chang Tso-lin, who was informed of the trouble, ordered Mr. Tao not to proceed to Peking but to come to him at once. The people, knowing that there would be no good result if any decision should be made in Mukden, immediately appointed Messrs. Chang Ping and Huo Wan-chen to make an appeal to General Chang Tso-lin, requesting him to cancel the agreement made with the Japanese. But Messrs. Tsai and Tao, foreign commissioner and taoyin of Yenchi, respectively, were there before them, and were secretly instructed by General Chang Tso-lin to support the Japanese. The representatives of Yenchi and Holung were received in audience by Mr. Wang Yung-chiang, who advised them to return to Kirin where they might appeal to their own officials, as Fengtien authorities did not like to interfere with the affairs of Kirin. They at once sought an interview with their commissioner and taoyin, who informed them that General Chang had already had an agreement with the Japanese, and that probably after the cancellation of the agreement, a Japanese loan would be contracted for the Chinese themselves to construct the line. The representatives lodged a written protest with these two officials, who showed the document to General Chang, but General Chang said that he did not like to handle the business and ordered that the representatives should return to Kirin to arrange with the authorities there. They at once returned and approached Mr. Kuei, the shenchang, who told them that being a native of the province, he would not conclude any agreement with Japan. At this time Messrs. Tsai and Tao paid another visit to Fengtien, where a secret agreement was signed between them and the Japanese. The agreement consists of 14 articles and stipulates that a loan of Yen 4,000,000 should be concluded for the enterprise. The publication of the news at once aroused the indignation of the people of Yenchi and Holung, but General Chang Tso-lin threatened to resort to drastic measures should the people raise any objection against his action. Again the people sent their representatives Messrs. Chang and Huo to the capital where they interviewed various important officials on the 13th and 14th October. Both the ministries of foreign affairs and communications have started to institute investigations, and the former will

lodge a strong protest with the Japanese legation after a report is received from Kirin. The Japanese legation will be informed that any agreement signed between Japan and Mukden without approval of the central government will be considered null and void.

Notwithstanding the protests of the waichiaopu, the Japanese minister has refused to consider it, or even to transmit the protest to Tokyo, basing his action on the statement that the contract was legally signed and ratified by a former minister of communications at Peking, and more recently ratified by the tuchun of Manchuria, Chang Tso-lin.

The formal agreement was signed by the Japanese company and the Chinese authorities notwithstanding the opposition of the ministry of communications in Peking. Furthermore, the Kirin provincial assembly declared that without its concurrence as the representative of the Kirin people, the agreement will be considered null and void; but General Chang Tso-lin says that by election of the provincial assemblies of Fengtien, Kirin and Heilungkiang, in his capacity as chief commander of the Paoan army or peace guards of Manchuria, he recognizes neither the veto of the Peking government nor the minority of opposition in the Kirin assembly, so that constructional works will begin by the concessionaire in accordance with the stipulations of the Sino-Japanese agreement which has been endorsed by the Japanese consulate-general in Mukden.

Such are some of the difficulties surrounding the most commonplace business for the development of China at the present time, but which, after all, are true to traditions and precedents.

Private Railways in Japan (*Continued from page 743*)

During the war many railway companies were unable to raise funds to build lines which had been licensed, and their licenses lapsed, but after the war there was a boom in railway building, and the boom still continues.

Tramways, urban railway lines, have also been increasingly prosperous, and since 1913 (Figures previous to 1913 are not obtainable), there has been a remarkable growth in the costs of construction per mile opened to business, although the mileage in operation has not shown a corresponding increase. The following table shows the development of tramways since 1913 :—

	1913	*1921*
No. of companies and official corporations operating tramways	124	189
Licensed mileage	1,625 miles	2,245 miles
Mileage opened to business ..	1,139 ,,	1,332 ,,
Costs of construction	Y.258,231,940	Y.933,683,450

Construction, as in the case of private railways, slacked off during the war. To-day, however, tramways are being constructed in all the principal centres of business, and the large cities are extending and improving their lines, the development of all the urban centres calling for large investments in better transportation facilities. Many of the cities where the tram lines are not owned by the municipality are planning the municipalization of the private lines. The city of Nagoya has just purchased the private tram lines in that growing city. To cover the purchase price a bond issue will shortly be floated. Such municipalizations are, however, difficult of realization under present financial conditions. The national government too does not countenance the issue of bonds for sale abroad. Consequently the advancement of the urban transportation facilities where capital must come through foreign investment is badly handicapped in Japan to-day.

The number of local (private) railways which received the governmental subsidy during 1921 fiscal year amounted to 51; the amount of subsidy reached Y.914,066 which was an increase of Y.293,552 as compared with the previous year. The following table gives the names of the railways, their mileage of operating lines, and the amount of subsidy :—

Names	Mileage	Amount (in Yen)
Malesuzaka Ry Co. ..	14.4	Y.1,909
Uonuma	8.1	3,355
Tateyama	13.0	6.933
Shonan	5.5	780
Yoro	35.8	65,218
Chuen	6.3	5,415
Miyazaki	12.5	14,474
Chugasa (Nakagasa ?) ..	15.7	246
Miyazaki Kenei	3.9	9,828
Odawara Denki	5.6	127,706
Ujima	10.6	19,438
Ichihata Keiben	13.0	3,781
Yokkaichi	10.2	1,019
Uwajima	11.1	598
Takeoka	6.0	593
Chiba Kenei	14.1	59
Ise	16.9	37.131
Anno (Yasuno?)	12.2	13,344
Akami	3.6	3,533
Onsen Denki	6.6	17,367
Nagaoka	18.8	6,877
Sutsu	1.2	46,157
Ako	7.9	13,537
Hideu	8.8	9,439
Akita	18.2	48,399
Nagareyama Keiben ..	3.5	4,493
Shinoyama Keiben ..	3.0	4,716
Onoda Keiben	2.9	33
Awa Denki	8.7	31,136
Ihata Keiben	4.0	4,820
Arita	5.7	13,136
Osumi	15.2	4,998
Anan	6.5	7,290
Funaki	3.7	4,645
Santo Keiben	6.1	2,106
Kusatsu Keiben	22.9	34,229
Joshu	6.5	6,134
Mie	3.7	9,546
Azumano	8.2	1,568
Ehime	16.1	78,158
Tsukuba	24.9	25,793
Yamato	6.3	10,825
Jozankei	18.6	9.315
Maruko	4.0	4,584
Nagato	11.3	3,634
Ohso	12.9	24,329
Kaetsu	4.1	15,661
Tama	4.4	26,233
Hizen Denki	6.0	26,538
Boseki	11.6	81,036
Saseho Keiben	9.0	21,571

Flour Industry in Manchuria

The flour industry in Manchuria has not been prosperous for some time, but owing to a good harvest of wheat, mill owners are very optimistic this year. There are now 46 flour mills in Manchuria with a daily capacity of about 60,000 bags (15,000 barrels). The following table shows the number of mills in the different parts of Manchuria and their respective daily output :—

	Number of Mills	*Daily Capacity*
Harbin	23	33,150 bags
Districts along the Chinese Eastern Railway ..	5	2,150 ,,
North Manchuria	6	3,600 ,,
Manchuria, South of Changchun	12	23,800 ,,
Total	46	62,700 bags

American Enterprise in China

Lamp Factory of the China General Edison Company at Shanghai

AMONG the industrial achievements in Shanghai, one of the best known, is the lamp factory of the China General Edison Company.

The visitor's car brings him out from the busy business section of Shanghai, through the residential section of the international settlement out into an old-time Chinese village. One's car crowds through the jostling wheel-barrows and ricshas, skirts a dirty creek crowded full of beggars boat houses, with their arched bamboo roofs, and passes a solid block of straw thatched huts. Just beyond these straw primative hovels of the villagers, the car comes suddenly to a large open field, on the left side of which stands the red brick lamp factory, and on the right rises the stack of the glass factory. The American flag waves over the field in a way expressing the contrast between the old and the efficient business policy of America, guaranteeing quality and fairness.

From a start five years ago this factory has grown until now the well-known G. E. lamps are produced in a factory, equipped with modern American machinery, capable of producing efficiently from four to five million lamps a year. And yet to an engineer visiting this factory, the impression is that this growth has only just begun.

In the sales office the visitor from America finds the Chinese clerks handling the same efficient system of handling orders as used in the home office of the International General Electric Company, except in so far as these methods have been modified by long experience to meet special conditions in China. American executives are in charge of this work.

The success of the sales office, however, has been due to the quality of goods turned out by the factory. The visitor passes on quickly to the factory itself. The American manager of this factory has two convictions, to prove which he came out to China. First, that the Chinese are able to turn out a product equal to any; and second, given proper supervision and good working conditions, Chinese labor can do this work efficiently.

One chart over the manager's desk proves the first point, superior quality in the lamps—for this curve of lamp sales, showed that there was no drop in the lamp business for 1921, in contrast to the almost universal sharp decline in business in almost every other line, due to financial conditions and competition. The G. E. Edison lamps have built up the reputation of good appearance, high efficiency and long life.



Electrically Driven Vacuum Pumps and Compressor

Other curves hang there in the manager's office, tell the story of factory management. Those black lines on the ruled paper, picture exactly from week to week, just what the factory organization is doing. Here is one showing the total lamp production per operator per hour. Another carries the individual or average production of each process of manufacture, such as filament winding, bulb exhausting, basing, testing, until the lamp is packed ready for shipment. If the curve goes up, showing a loss, or drop in speed, careful investigation follows. In fact, unless the curve goes steadily down and down, showing increased speed and less loss, personal investigation follows. Under modern supervision the efficiency of the Chinese operators has been increased 50 per cent.



One of the Glass Furnaces for Bulb Making



Drawing a Glass Tube 125 feet long



Filament Winding Tables



Anchoring Machines, supports for Filaments

High across these curves, there is drawn a bright red line, showing the best record that has been made by American lamp works in each particular process. Any individual operator or group of operators who make their records meet this red line, are given a bonus. Those black curves touch the red line more and more often as the weeks pass, showing that the manager's belief is being justified and that Chinese labor under proper supervision cannot only do good work, but do it efficiently.



Preparing and Coating Tungsten Wire for Mounting

Out in the factory, this management takes on personal terms. The man in entire charge of production is an American. Under him are two Chinese engineers, who have been thoroughly trained through technical schools in America, and five years of practical experience in lamp manufacturing in the States. The remaining foremen have each been personally trained for their particular work. Of the three hundred and seven employees under these trained engineers, ninety-nine have been with the company for two years or more. Under careful supervision the employees have learned to do their work well. In the large factory room, the neat dress and the fast quiet work of the Chinese women operators at once catches the attention. The comfortable loose waist and neat pants of the Chinese women form the most ideal cloths for work. The slender flexible Chinese hand is peculiarly fitted for the manipulation of delicate parts of lamp construction. Right by the door, as the visitor goes in is the testing rack—a constantly moving circle of lamps, constantly replenished by the operator, with lamps to be

(*Continued on page 756*)



Exhaust Machines



Exhaust and Sealing in Machines



PROPOSED BRIDGE BETWEEN NANKING AND PUKOW ACROSS

Report Upon a Project for Bridging the Yangtze River Between Cities of Nanking and Pukow

By Dr. J. A. L. Waddell, Consulting Engineer

Peking, October 28th, 1921.

This is the second of the bridge designs prepared by Dr. Waddell for the ministry of communications and given by them to the Journal of the Association of Chinese and American Engineers for publication. The material is self-explanatory. It may be interesting to note that Dr. Waddell did not consider a bridge across the Yangtze at Nanking justifiable in view of the traffic. The river bottom at this section is extremely uncertain and consists of a soft silt to an unknown depth. The harbormaster instructs all ships anchoring there to lift their anchor at least once every 36 hours. Anchors left in longer than this time usually become imbedded and cannot be pulled out.

The type of foundation recommended by Dr. Waddell is similar to that prepared for him for the bridge across the Mississippi River at New Orleans, for which he was the consultng engineer. The erection of the bridge at New Orleans has been postponed due to the high price of steel resulting immediately after the conclusion of the war, but operations are expected to be resumed some time in the near future. [The Mississippi at New Orleans also has an unknown scour and a varying silt bottom.]

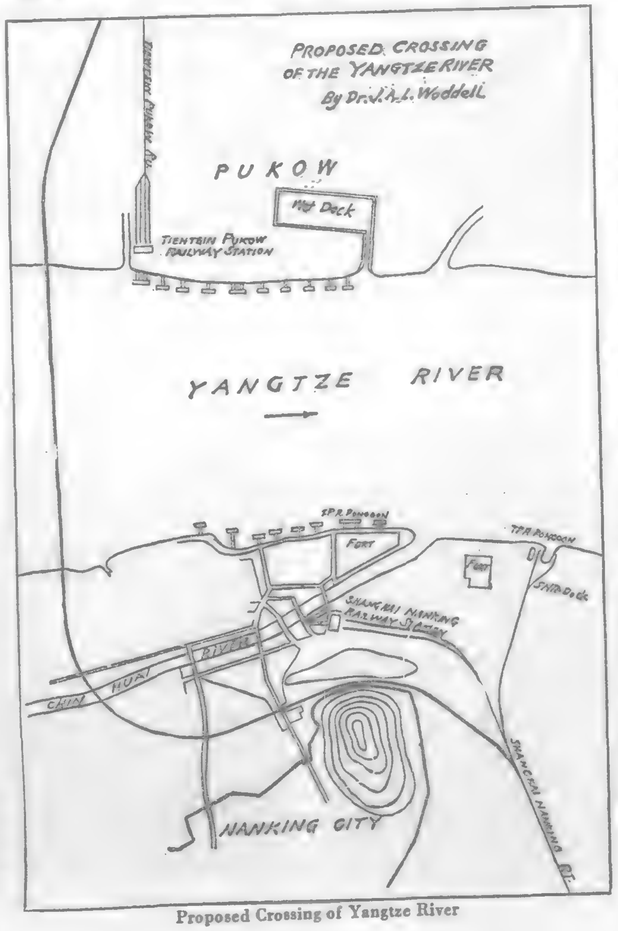
To His Excellency,

The Minister of Communications,

PEKING.

Your Excellency,

After completing my investigations at the mouth of the Han River in relation to the proposed bridging near there of that stream and the Yangtze-Kiang. I proceeded to Pukow for the purpose of looking into the possibility and expediency of building a bridge across the latter river between the cities of Pukow and Nanking; and now beg to report as follows:



Proposed Crossing of Yangtze River

Feasibility.

The conditions for building a birdge at this location are difficult, for the caissons of the piers would have to be put down far deeper than those of any other bridge yet built, because, as well as I can determine, there is no bed-rock within reach, and the depth of water at lowest stage is over 160 feet. This does not mean that it is impossible to build the proposed structure, but only that it would be expensive, especially as contractors are timid about attempting to accomplish the unprecedented. However, I should not hesitate an instant about undertaking to design and engineer the building of such a bridge, were I called upon to do so. I have already advocated the construction of a great bridge across the Mississippi River at New Orleans, where the conditions are unprecedented and quite similar to those here under consideration. However, in this case it might prove necessary to found the caissons somewhat deeper below low water than those for the proposed New Orleans strcuture.

Expediency.

In respect to the question of expediency, I am compelled to report adversely to the project; because there is no traffic of any kind between the two cities which would begin to warrant the construction of such an expensive structure as the proposed bridge would have to be. Nor do I believe that, even in the next fifty years, there will be any business large enough to require its being built. Only a single line of railway now enters Nanking; and that line parallels the river from Shanghai. As steamers can always carry freight more cheaply than railroads, all freight from Shanghai destined north will naturally go by water to Pukow, and will not need to be carried across the river. Thus only the passenger traffic of a single railway would use the bridge; and at present there is not enough of it, in my opinion, to warrant the building of a carferry—much less a bridge. The little passenger traffic bound northward, and that of the reverse journey towards Shanghai, can readily be taken care of for many years to come by two fair-sized ferry boats of the ordinary type.

Although I am opposed for economic reasons to the construction of the bridge, as the problem of how to build it and to determine the approximate cost thereof has been set me, I shall proceed to its solution.

Sources of Information.

I obtained the necessary information for the making of cost estimates from several reliable maps and charts, and by asking questions of certain persons residing in Nanking, also by a personal reconnaissance of the route for a railway connection between the roads on the two sides of the river. On Sheet No: 1 of the accompanying drawings is shown the line of route, from the railway to the south to and across the river and then towards a connection with the railway on the north. The route was easily determined, as there was but little choice of crossings. The cities are situated opposite each other on the two sides of the river and at its narrowest point in the vicinity. The bridge tangent was located up-stream from the right line joining the ciries centres for two reasons:

First. It gives a satisfactory means of connecting the two railway systems without material injury to property, and

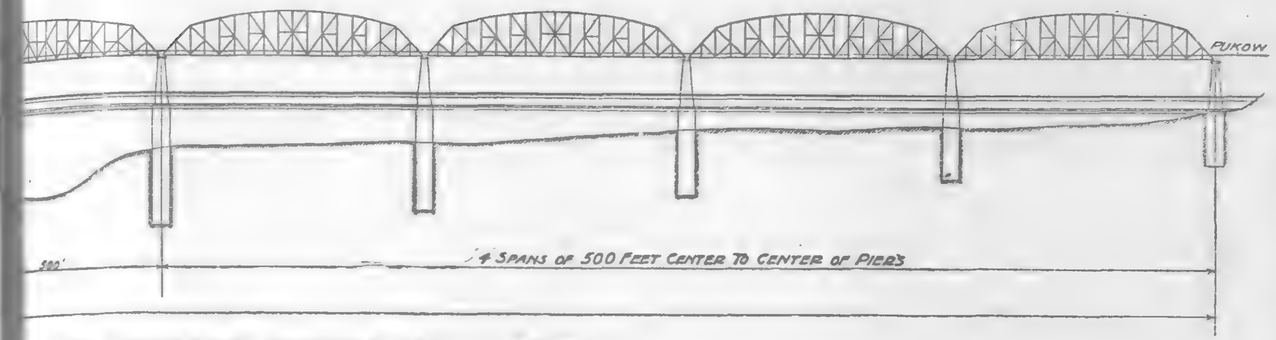
Second. It avoids the necessity for opening the lift-span to accommodate the passage of vessels not destined for up-river points beyond Nanking.

River Conditions.

As these are of a similar character to those at Hankow, although there are not as many junks passing, I have assumed, as before, a minimum clearance of 150 feet above extreme high water for ocean-going vessels under the vertical-lift span and one of 60 feet above the same everywhere else for junks. The difference in height between extreme high water and extreme low water is only 24 feet. or less than half of that at Hankow.

Layout.

Starting from the south bank, the structure, consists of two simple-truss spans of 500 feet each, then an anchor arm of 500 feet, then a cantilever span of 750 feet, then another anchor arm of 500 feet, and finally four simple-truss spans of 500 feet each, all distances being measured from centre to center of piers. These



THE YANGTZE RIVER. DESIGNED BY DR. J. A. L. WADDELL



The Yangtze at Hsiakuan (Nanking)

nine spans will cover practically the entire river between highwater shore-lines.

The greatest depth assumed for caisson foundations is 250 feet below low water at the deepest part of the section; and from there to the banks it gradually reduces to 100 feet. It is possible, of course, that these depths are not great enough to reach sufficiently-solid material to afford proper bearing-resistance, but this point cannot be settled without the making of expensive borings. The assumption, however, is sufficiently accurate for the preparation of a preliminary estimate of cost.

Traffic Provisions.

As the cities of Nanking and Pukow are not of great commercial importance, and as their populations are comparatively small, there is no need to provide on the bridge for highway or pedestrian travel. In future it would be practicable to build approaches to the structure for an electric-railway system and to carry its tracks by gauntleting over the space occupied by the steam railway.

Owing to the great width of river and to the possible future importance of the proposed bridge, a double-track-railway structure has been adopted. It would not be good engineering to consider the building of a single-track structure for such a crossing.

Grades.

The limiting grade on the approaches I have taken as one per cent., properly compensated, of course, for curvature.

Live Load.

As in the case of the proposed Hankow crossing, the railway live load selected is Class 60.

Methods of Construction.

Owing to the great depths of both the water and the caisson foundations, the sinking will have to be done by the open-dredging process, and the shells of the caissons will have to be built of timber. The piers are to be constructed as described in my previous report upon the proposed Hankow crossing and the spans are to be floated to position.

Materials.

In respect to the unit prices of materials and the quantities thereof, see the just-mentioned report.

Estimate of Total Cost

Superstructure.

Ordinary carbon steel	63,000,000-lbs.	@ 11 cents	$ 6,930,000
Machinery and Ropes	680,000-lbs.	@ 50 cents	340,000
Floor	4,750 lin. ft.	@ $30	143,000
Counterweights ..	900 cu. yds.	@ $25	23,000
Electric machinery and house			54,000
Total Cost of Superstructure			$ 7,490,000

Substructure.

Main Piers, 4 @	$1,100,000 (Average)	.. ..	$ 4,400,000
End Piers, 2 @	280,000 (Average)	.. ..	560,000
Other Piers, 4 @	530,000 (Average)	.. ..	2,120,000
Total Cost of Substructure			$,080,0000

Total Cost of Structure.

Superstructure	$ 7,490,000
Substructure	7,080,000
Approaches	3,150,000
Summation	17,720,000
Engineering and Contingencies, 10%	1,772,000
Grand Total Cost of Structure	$19,492,000
Say $19,500,000	

Economics.

The close equality in total costs of substructure and superstructure indicates that my layout is not far from economic. The diagram on page 164 of "Economics of Bridgework" shows that the economic span-length for foundations of this assumed depth for double-track railway bridges is 430 feet; and the diagram on the previous page evidences that a variation of 50 feet above or below this figure would make very little difference in total cost of structure. This would make the range for such depth from 380 to 480 feet, while I have adopted 500 feet. I think that, for the assumed conditions at the proposed crossing, the larger figure is more nearly correct than the record of the diagram, owing to the high price of substructure timber and the difficulties that would be encountered in putting the caissons into proper position.

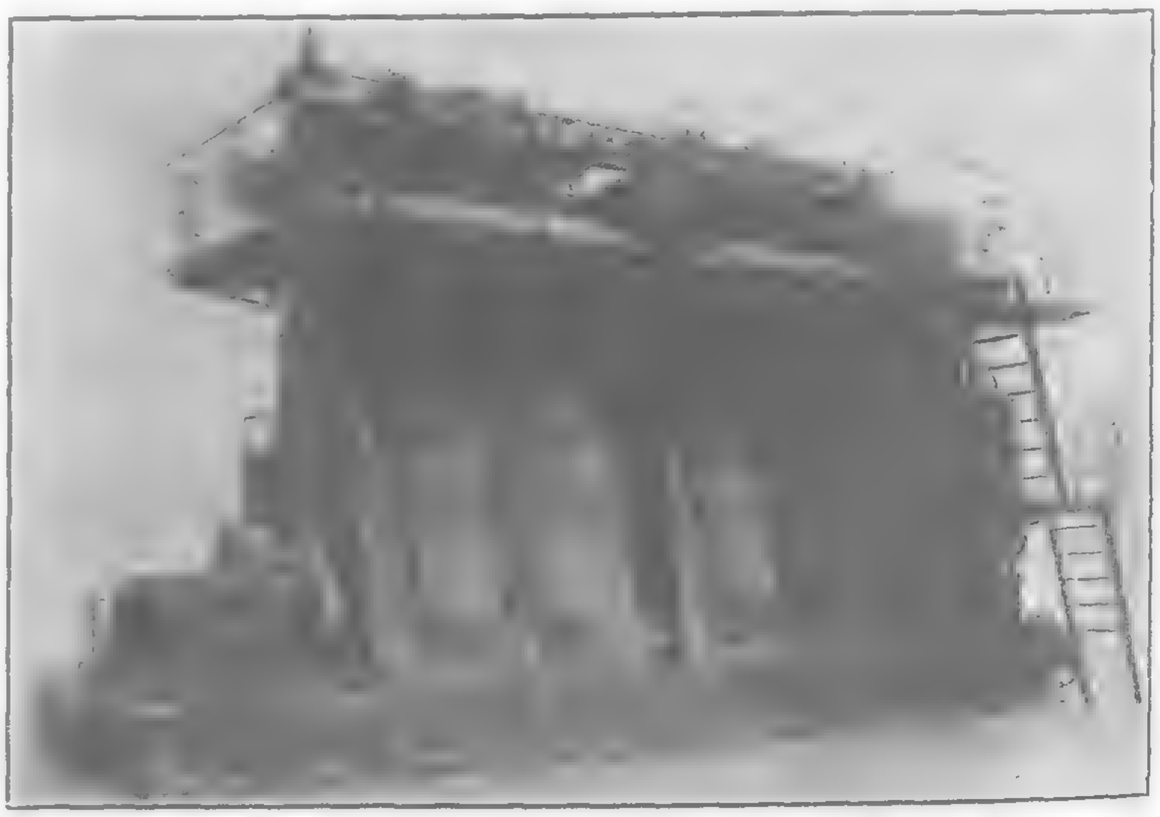
Conclusion.

Owing to lack of reliable data concerning substructure conditions, the preceding estimate is not as accurate as the one I made you for the proposed bridges over the Yangtze and the Han Rivers at Hankow; but it is close enough to correctness for all practical purposes, especially in view of the fact that I am advising against the construction of the bridge.

The Largest Diesel Engined Vessel

A New Success of the Sulzer 2-Cycle Engine

THE Union Steamship Co. of New Zealand has placed an order with the Fairfield Shipbuilding Co., Ltd. in Glasgow for a motor passenger liner of 22,000 tons, which will be equipped with machinery of the Sulzer 2-cycle type of 12,000-13,000 BHP. Beside the main engines there will be auxiliary engines of about 1,500 BHP., the total engine power amounting to about 14,000 BHP. This ship will not only exc'te general interest because it is the largest passenger motor liner, driven by Diesel engines, but specially in view of the machinery, which in size and power by far exceeds anything that has been done up to now in connection with motor ships. The Fairfield Shipbuilding Co. is a licensee of Sulzer Brothers in Winterthur. This new order seems to prove the fact, that for large powers the 2-cycle engine is decidedly more advantageous than the 4-cycle and as the general tendency is towards the building of big ships an important field is opened for the 2-cycle system of Diesel engines.



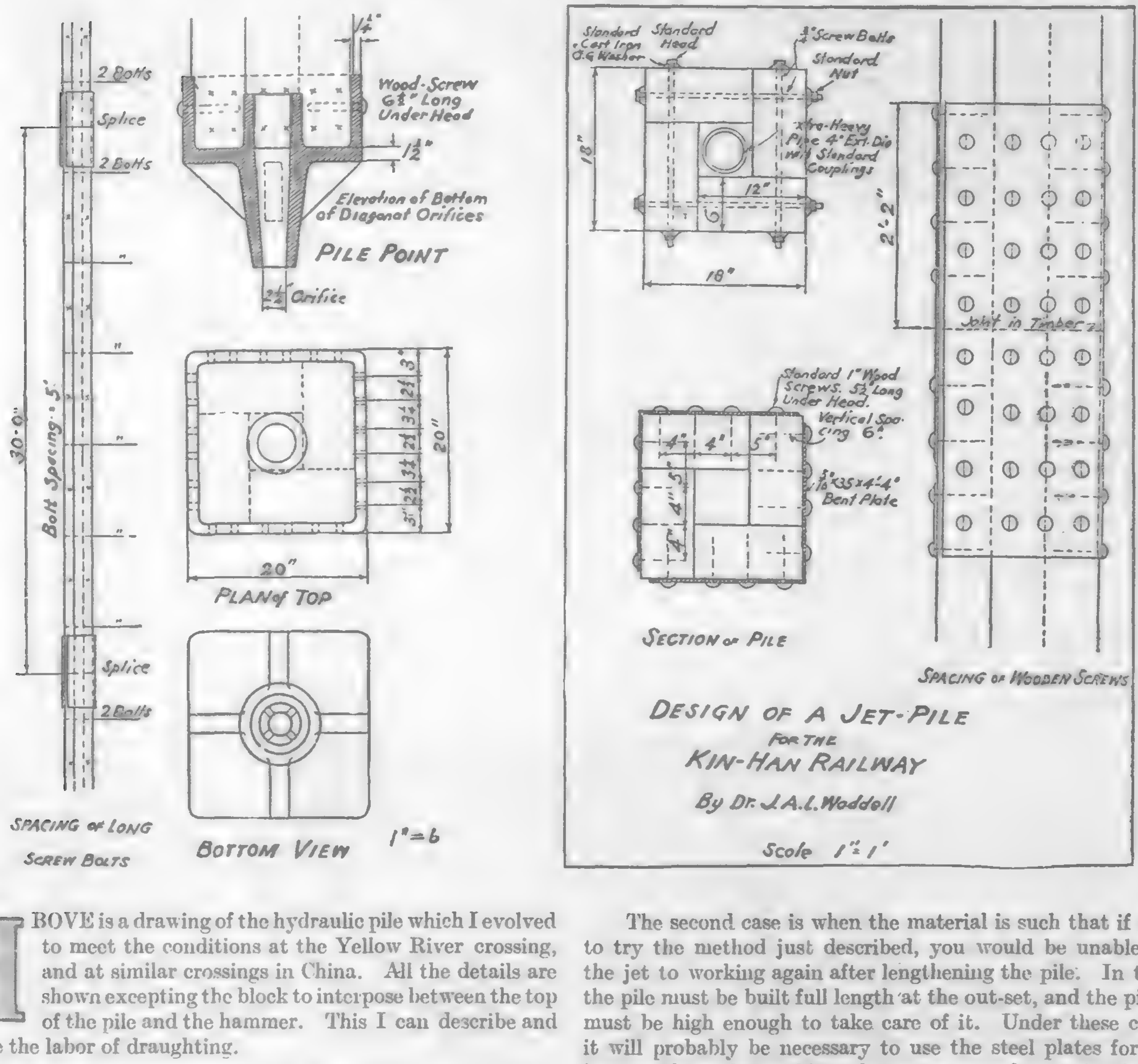
Sulzer Direct Reversible 1,250-S.H.P. Two-Cycle Marine Engine

It may be mentioned as a curiosity that this special development of motorship equipment has been started by a firm in Switzerland, a country completely cut off from the sea.

A Hydraulic Pile for Use on the Yellow River Bridge and for Other Foundations in China

Recommended by Dr. J. A. L. Waddell to the Ministry of Communications

The large saving made by Dr. Waddell on his different bridge designs for the Yellow River and Yangtze crossings were in great part made possible by the type of foundation chosen by him. This included the use of the hydraulic pile as described below. Dr. Waddell believed that the most economic type of foundation for the majority of the Chinese railroad bridges, particularly those in the alluvial plain regions, was the pile caisson type, that is, a caisson sunk to ten or fifteen feet below the river bottom and resting upon concrete imbedded piles.—*Journal of the Association of Chinese and American Engineers.*



ABOVE is a drawing of the hydraulic pile which I evolved to meet the conditions at the Yellow River crossing, and at similar crossings in China. All the details are shown excepting the block to interpose between the top of the pile and the hammer. This I can describe and thus save the labor of draughting.

It can be made of either timber or metal, and there must be a hole at one side large enough readily to permit the passage of the goose-neck. When this goose-neck is to be removed, the hammer is raised, and then the block is raised also. After this, the goose-neck is unscrewed and another length of pipe attached.

There are two ways in which this pile can be used, depending upon the condition of the soil. If the latter be such that you can drive down a pile say 50 or 60 feet by the water-jet, then take off the jet, extend the pipe, extend the pile, put on the jet again, and proceed, your work would be much simplified, for then you would not have to pick up and handle very long piles and submit them to great bending moments. In this case, you can use timber scabs for the splicing of the abutting ends of the pile sections, and thus save the expensive metal that I have laid out for splicing.

The second case is when the material is such that if you were to try the method just described, you would be unable to start the jet to working again after lengthening the pile. In that case, the pile must be built full length at the out-set, and the pile driver must be high enough to take care of it. Under these conditions it will probably be necessary to use the steel plates for splicing, because the scabs would not be strong enough to resist the bending due to the weight of the long pile, if it were picked up near the middle to swing it into place.

The following is a description of the pile. It is to be built of 6-in. by 12-in. timbers thirty feet long, more or less, but all of the same exact length, in a square section of 18-in. with a 6-in. square hole in the interior. All joints are to be square cut. At the lower end of the pile there is a casting of either steel or iron, preferably of the latter, if made in China, as it should be. Probably a cast-iron point would weigh quite a little more than a cast-steel one. The design that I have made will be amply strong for all conditions to be met with, including beds of fairly large boulders. You might find later on that you can trim down the thickness of the metal considerably, and thus economize on the cost. If you know for certain that

(*Continued on page 753*)



The Hall-Scott Motor Coaches in operation on the Kowloon-Canton Railway

Motor Coaches on the Kowloon-Canton Railway

THE last few years have witnessed great strides in the development of railway transportation. The phenomenal increase in operating costs and the serious competition of motor-bus lines on the short haul traffic, has caused the railway officials a great deal of thought in both the United States and Europe.

The problem of cutting these costs were taken up by the manufacturers of railway equipment, and one of the solutions offered was the motor coach. These coaches are equipped with internal combustion engines, from which the locomotive and lighting power is derived.

The first railway in the Far East to adopt these coaches was the British section of the Kowloon-Canton railway. Two of these coaches arrived at Kowloon in the early part of December 1921 and during the past year have proved entirely satisfactory. The directors of the Manila Railway Company are now recommending the use of similar cars in order to compete with the increasing number of motor passenger and freight autobuses, and from Korea we learn that the authorities have abandoned the idea of electrifying the Seoul-Jinsen (Chemulpo) line at an estimated cost of Y.1,800,000, in favor of automotive railway cars, which can be purchased for Y.300,000. Other parts of the Far East are also confronting similar transportation problems arising from the loss of revenues through motor competition. With railway operating costs mounting higher each year attention is being attracted to the employment of a more economical transportation medium, by applying motor trucks to traffic problems.

The motor coaches and trailers for the Kowloon-Canton railway were supplied by the Hall-Scott Motor Company of Berkeley, California.

The car bodies are of steel construction throughout, measuring 61-ft. 11½-in. over sills, the interiors finished in west coast mahogany, the first-class compartment being fitted with seats upholstered in imitation leather, and the second and third with hardwood slat seats. The coaches and trailer are lighted throughout with electric lights by means of a 3½ K.W. Delco internal combustion engine, ceiling fans being provided in the first-class compartment.



Interior of the Motor Compartment of the Hall-Scott Motor Coaches for the Kowloon-Canton Railway

The motor coach power consists of a Hall-Scott M-6 type 150 h.p. 6-cylinder engine with cylinders 8-in. by 10-in. adapted for using kerosine as fuel. The motor is equipped with high-tension magneto and distributor with coil and battery connection providing two separate sets of ignition entirely independent of each other and running to two sets of spark plugs. Carburetor is of the float feed type. The air compressor is of two cylinder water cooled type with cylinders 4-in. by 4-in. directly driven from engine. The engine is equipped with





INTERIOR VIEWS OF PASSENGER COMPARTMENTS OF THE NEW MOTOR COACHES FOR THE KOWLOON-CANTON RAILWAY

Third Class First and Second Class



Motor Coach and Trailer, Kowloon-Canton Railway

electric starter. Engine cooling is provided by means of a vertical copper tube radiator with large diameter belt driven fan in connection. A 75-gallon storage tank is installed on the car underframe with pipe leads to side wall, double compartment kerosine and gasoline gravity tank, suction pump driven directly from engine to main tank for carburetor feed; gasoline compartment of gravity tank providing for initial starting of engine.

Transmission is of the selective type allowing of four speed changes in either direction.

On the level the motor coach can run up to 50 miles per hour, or with trailer 40 miles, the combined seating capacity being 90 third-class, 36 first and 36 second and luggage compartment. The coaches are fitted with Westinghouse quick-acting and straight-air brakes.

A HYDRAULIC PILE

(Continued from page 751)

there are no boulders to be encountered, you can make the casting as thin everywhere as it is practicable to pour it.

The timbers are to be bolted to the casting so firmly that there will be no chance for detachment during driving. The splices, if of steel, are to be made with $\frac{5}{16}$-in. by 35-in. plates, 4-ft. 4-in. long, bent to a right angle, and bored for the passage of wood-screws $5\frac{1}{2}$-in. long under head—but no longer. As shown on the drawing, the arrangement of the holes must involve staggering on the two sides of the bent plate, so as to avoid clashing of screws.

As before indicated, under certain conditions plank scabs $2\frac{1}{2}$-in. by 17-in. by 3 or 4-ft. long with beveled lower edge can be used the thickness at the lower end being about $\frac{1}{2}$-in.; this to provide for going through hard material such as gravel or boulders.

The four timbers forming the pile are to be screw-bolted together with $\frac{3}{4}$-in. bolts and cast-iron washers—all as shown on the drawings. There is no need whatsoever for sinking these washers into the timber in order to avoid friction.

There is to be a 4-in. extra-strength pipe cut into lengths convenient for handling and attaching, with the usual couplings that turn in a right-handed direction. The connection of the pile to the casting, however, must be left-handed, so that by twisting the long pipe in a right-handed direction it will be detached therefrom after the pile is driven. On this account, whenever an extra length is being added to the pipe, the part already in place must be held tightly by tongs so as to prevent any turning thereof.

At the top of the pipe there is to be a goose-neck, attached by ordinary couplings, with some kind of a quickly-made connection to the 4-in. hose leading to the pump.

This hose is to be of the very strongest kind procurable, so as to permit of a high water pressure—say 200-lb. per square inch.

For the timber I would suggest Oregon fir cut *full size* so that the pile, when finished, will square all of 18-in. If the timber be purchased in a large quantity, the odd size will cost almost nothing extra, except for the larger amount of timber used. Of course, timber of standard market section, which is always a little less than the nominal section, can be used, but it will not be quite so convenient. It might be found after trial that it would pay to have all timber dressed full size on all four faces, but I anticipate that this refinement will not be needed.

Of course, care must be taken to stagger the long screwbolts attaching the component timbers, in order to avoid interference and the unnecessary weakening of the timber section at any point.

Holes will have to be bored full-size or even $\frac{1}{16}$-in. greater for the long screw-bolts; but only very small holes should be used for the short wood-screws. Possibly these holes may be omitted altogether, but I think not.

If any trouble be experienced in making the casting in China, it can be divided into two parts by a plane on A. B, but in that case the total thickness of the two adjoining bases should be $2\frac{1}{2}$-in. or $1\frac{1}{4}$-in. each. These two castings would have to be bolted together by a number of turned 1-in. or $1\frac{1}{4}$-in. bolts in drilled holes.

All bolt-holes in the casting would have to be drilled.

The volume of water used would have to be about 500 gallons per minute, at least, and possibly somewhat more, all depending upon the character of the soil to be penetrated. It is true that in some of my work I have used 350 gallons per minute and have found this to be sufficient, but I believe that the larger amount would be preferable.

Japanese House Buys $50,000,000 Yearly in U.S.

Mitsubishi Interests Controlling Eleven Separate Enterprises, Employing 100,000 Men, Large Importers of American Products

By A. V. Gilleaudeau in the "American Exporter"

FIFTY million dollars a year or almost one million dollars a week! Such is the average value of the purchases of American goods made by the New York branch of a large Japanese trading company for its principals in the Orient. In this fact alone there is a story of interest and significance to merchants everywhere.

The products which the Mitsubishi Company buys in the United States include machinery of all kinds, machine tools, motor cars, lorries and tractors, iron and steel products, electrical installations, freight handling and conveying equipment, construction material and many other lines.

The company has its headquarters in Tokyo, with branches in all the principal cities of Japan, as well as in China, India, Australia, Siberia, Dutch East Indies, Straits Settlements and the Philippine Islands. In addition to two branch offices in the United States, in New York and Seattle, Wash., the company likewise maintains several European offices.

The Mitsubishi Trading Company buys in the United States not only for the account of its principals in Japan but on indent for its customers in the various markets in which it operates. The variety of goods which it is called upon to purchase in the United States isindicated by the fact that the Mitsubishi interests in Japan control eleven separate enterprises employing some 100,000 men. Among these enterprises, most of which are large importers of American goods, are ship-building yards, iron and steel mills, paper mills, machinery plants, glass factories, canneries, a warehousing company, engineering works and others. The trading company, which is specifically occupied with a general import and export business, is an outgrowth of the requirements of these various interests. Organized in 1918 to import the requisite supplies for these interests and dispose of their products in foreign markets it has since then developed an important import and export business on its own account.



Baron Koyata Iwasaki
Head of the Great Mitsubishi Interests in Japan



The Mitsubishi Head Office at Tokyo

Departments Are Under Direction of Specialists

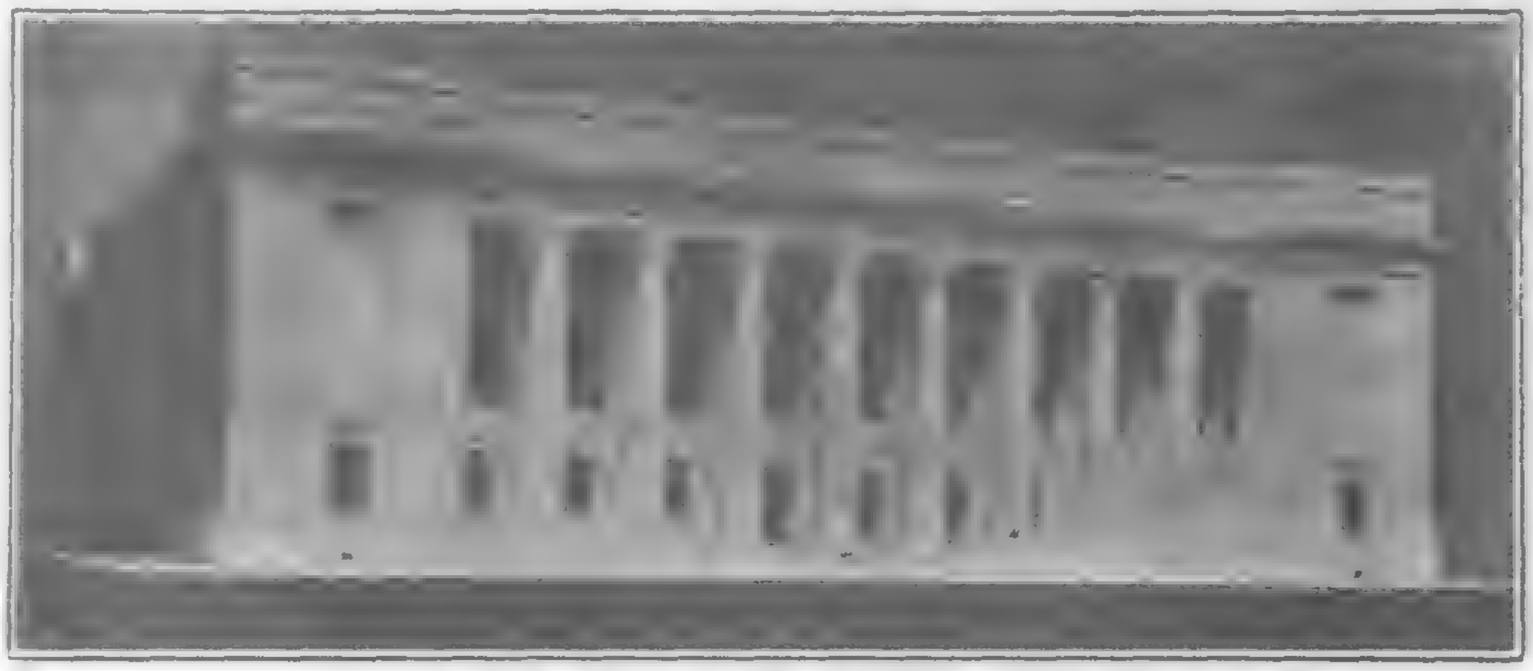
The New York office of the Mitsubishi Trading Company employs 55 people and its business is carried on by six different departments. These departments deal respectively with machinery, metals, general merchandise, coal, oil and steamships. The heads of these departments are specialists of long experience in their individual lines, with thorough knowledge of requirements of the markets in which the company operates. As is necessarily the case in the transaction of a business of so large an aggregate volume, accuracy and detailed instructions to manufacturers are characteristic of the buying policy of the New York branch. All orders to American manufacturers are detailed, specific and comprehensive, and are embodied in a special form of contract evolved by the house. Orders are accompanied by explicit instructions covering packing, marking, invoices and necessary documents. Careful attention to these details, the New York office has found, eliminates error and delay in securing the desired merchandise.

The buying policy of the house is that of shrewd and progressive merchants everywhere. Large stocks of readily salable merchandise are bought for, and carried by, the various branch offices in the Orient. Samples of such merchandise as textiles, provisions and certain types of machinery are on display in these branches. Bulk goods such as heavy chemicals, fertilizers, grain, iron

and steel products, etc., are always stocked. The New York branch, when it observes that the demand for American products in any line in especially active, takes measures to anticipate the requirements of its principals for some time in advance.

Research Department Keeps in Touch with Market Conditions

One of the progressive features of the New York branch of the company is a well-staffed research department whose function it is to keep in close touch with market conditions throughout the United States, and which through export journals and other sources of information is always well posted with respect to new trends in manufacturing as well as new and successful merchandising ideas as they are developed. Constant vigilance and careful attention to these developments as they occur has been found by the New York branch to be extremely profitable, since it has on many occasions been able first to introduce improved equipment or merchandise to its markets abroad.



THE NEW MITSUBISHI BANK AT TOKYO

The architecture and equipment has been adopted from one of the most famous banks in New York City, and much of the equipment imported from the United States. The bronze doors were specially made in the U. S. at a cost of $45,000. All the tiling of the large banking floor was made by an American manufacturer; the rugs and carpets used in the building were ordered from a firm of prominent American decorators, and the safe deposit vaults were bought in the U.S. at a cost of $60,000.

Another function of the New York buying office of the company is to secure the agency for its markets of attractive and suitable American merchandise. At the present time it acts as sole agents in these markets for several American manufacturers of motor cars and lorries, machinery and machine tools, electrical materials and machinery, tyres, tubes and mechanical rubber goods.

Transactions Are on a Big Scale

These and other similar lines are handled in the Far-Eastern branches of the Mitsubishi Trading Company, in very much the same way as they are in the United States. Large stocks are carried and a great deal of attention is devoted by the company to adequate and attractive display of goods and to sales promotion.

By far the largest proportion of the business transacted by the New York office is for the account of the various enterprises controlled by the Mitsubishi interests in the Orient, for the Japanese government, and for large industrial establishments in Japan which the company numbers among its customers. The purchases of the company in the American market are therefore unusual and somewhat remarkable both in respect to diversity and importance.

For example, during the first months of 1922, the New York office bought 70,000 tons of steel materials at a cost of some $3,000,000, 30,000 tons of which were steel rails purchased for the Imperial Railways of Japan. Recently the Mitsubishi Warehouse Company which operates as shipping and forwarding agents, custom-brokers and wharfingers in the principal ports of Japan, decided to build a new wharf. The company sent its own engineers to the United States to study as models the army and navy bases in the principal American ports. These engineers upon the conclusion of their investigation returned to Japan, drew their plans, sent the specifications to the New York buying office, and bids called for from American manufacturers for the supply of the complete equipment required.

It is interesting to note that the warehouses of the Mitsubishi Warehouse Company, which cover a total of 150 acres in the principal ports of Japan, were modeled entirely upon similar developments in the United States. The sheds and warehouses, with few exceptions, are built of brick and stone with iron frames, and are equipped with automatic sprinkling systems, hydrants, fire-extinguishers and automatic fire-proof doors, all of which were imported from the United States. Similarly, the electric cranes and automatic freight handling equipment were bought from American manufacturers.



Kobe Branch Office



Osaka Branch Office

Another large order recently placed by the New York office shows the progressiveness of the house in its policy of introducing improved machinery and equipment. This order, given by the Japanese government, called for the purchase of a ship-stabilizer weighing 170 tons, the largest ever built in the United States.

The Mitsubishi Bank, Ltd, recently completed the construction of an imposing building in the Marunouchi district of Tokyo, where the Mitsubishi interests are erecting a number of office buildings similar to those lately erected in the United States. The architecture and equipment of the new banking house is adapted from that of one of the most famous banks in New York. The vaults, for example, were bought in the United States, at a cost of $60,000. The bronze doors, which cost $45,000, were likewise bought in the United States. The entire tiling of the enormous banking floor was specially made by an American manufacturer, and all the rugs and carpets used in the building were ordered from a prominent firm of American decorators.

These examples indicate the unusual buying problems which from time to time confront the Mitsubishi office in New York. Concurrently, however, the buyers are occupied with less spectacular, if no less important activities. The general merchandise department purchases and ships to the Orient large quantities of grain, fertilizer and heavy chemicals. The machinery department is constantly sending forward such goods as cranes, pneumatic hammers, welding machinery, lathes, cotton-spinning machinery, elevators, switchboards and meters. It does a considerable volume of business in motor cars and lorries, tractors, and automative products generally.

It frequently is called upon to purchase complete equipment for some new plant belonging to one of the several Mitsubishi enterprises, such as, for instance, a large installation of paper-making machinery bought some time ago for the Mitsubishi Paper Mills. Similarly, the machinery department has purchased in the United States rollers and furnaces for the large iron and steel works controlled by the Mitsubishi interests, and mining machinery for its coal and iron mines.

The activities of the various Mitsubishi enterprises for which the trading company buys in the United States, and the merchandising activities of the trading company itself in the Far East illustrate the thorough and consistent application of principles and methods characteristic of business in the United States. The showrooms of the Mitsubishi Trading Company in the Orient are well adopted to the demonstration of machinery and adequate display of goods, and are provided with all the facilities for effective merchandising which are incorporated in similar buildings in the United States.

The Marunouchi building, a modern office structure of American type, which is being built in Tokyo for the Mitsubishi Company by an American concern, the George A. Fuller Company of the Orient, Ltd., is now nearing completion. It is equipped with such modern conveniences as mail chutes, heating and water supply systems of the most up-to-date type, and has 11 elevators. The ground floor is traversed by two arcades, which are lined with about 30 shops.

An idea widely employed by large industrial enterprises in the United States, the formation of organizations of their employees, has been successfully adopted in the Mitsubishi Club, an association with a membership of 9,000, having 47 branches throughout Japan. The club is instrumental in fostering the spirit of the various enterprises under Mitsubishi control through its several activities. Among the most characteristic of these are the publication of a magazine for the employees, and the maintenance of a building in Tokyo to provide living quarters for bachelor members of the staff.

American Enterprise in China

(*Continued from page 747*)

tested, each new lamp taking the place of a lamp which has gone through the test and come out in perfect condition. Further along, there is a line of desks, at which work the skilled filament winders, weaving the hair-like Tungsten wire on to the fish hook supports in the lamp. This fine drawn Tungsten wire, which is the most important element in the lamp, is, and always will be, imported from the general electric factories in America. The lamps go from process to process and at each step are handled by women who have proved best able to do the work accurately and well. The pay is either piece-work or on an hourly basis, as each particular job requires. The increased speed and productiveness of the workers, has justified this factory paying fifty per cent. more than any native manufacturers, but this is done only because of the increased demand for efficiency and care.

As each step is finished, the lamps are carried on large racks from process to process by men. Back in the boiler room and machine shop men do the work, the packing also is a man's job. And as packing in the Orient, for rough handling and humid climate, represents special problems, special attention has been given it. Lamps are wrapped and packed for export in strong wooden boxes so as to prevent breakage and effects of weather. Thus each type of work is suited to the worker, so as to bring the best results.

Good conditions of labor have been maintained as well. The American manager believes the largest results are obtained under conditions similar to those in the United States. Instead of going to long hours and seven day work, the factory has maintained ten hours of work a day, six days a week, the factory being closed on Sundays. Such hours and a full day of rest each week is a thing previously unknown in China.

Child labor will never be an issue in the factory, for no one under sixteen years of age is employed. Due to complete protection against accident, the factory holds a record of no serious accidents since lamp product is began. Such high standards of factory labor react not only towards the most efficient and high quality of production in this factory, but also are the most telling example to the factories in this country, where the tendency is towards the sweat shop conditions so long ago condemned in America.

With expert supervision, and connected and efficient labor, the remaining element in producing good lamps, is raw material. So far as is consistent with the best results, China is made the source of supply. The wire, as already stated, is imported from America and so are certain of the chemicals and brass parts, but glass sand and all other materials are purchased locally, the factory taking only such materials that prove out to be of the highest quality. In the search for the best materials, much light is being thrown on the resources of China.

From the lamp factory itself, the visitor goes across the large roomy lot, to the building where the glass bulbs are blown. The glass furnaces, the bulb blowing moulds, the tube room, and the mixing equipment, all have a capacity for supplying the entire demands of the factory, thus eliminating the need of trusting to outside factories for any of the glass work. The American expert can thus keep track from day to day of the exact quality of the glass that goes into every G. E. Edison lamp.

Adjacent to the glass house is the porcelain factory, a new building where production of porcelain wiring devices is under way, but this is another department, indicating however, that the work in Shanghai will not be restricted to the production of lamps, but will expand as the market for different products grows.

As the visitor leaves the open grounds of the China General Edison Company, the American flag at the entrance typifies for him with new meaning, the fact that here a group of Americans are building up a branch of the general electric organization with the same standards as those maintained at home. "Made in China" means in this case, good quality, high efficiency and long life in G. E. Edison lamps.

Electrically-Propelled Cargo Ship "Biyo Maru"

8,800 Tons d.w. on 25-ft. 9-in. Draft. Built by the Asano Shipbuilding Company, Tsurumi, Japan, with Engines by the Ljungstrom Turbine Company, Limited, Finspong, Sweden

THERE has lately been added to the fleet of the Toyo Kisen Kaisha, of Japan, an electrically-propelled cargo ship of 8,800 tons d.w., which it is claimed is the first electrically-propelled merchant ship to be built in Japan. The vessel, the *Biyo Maru*, launched on December 22, last, is one of nine cargo-ships which are building for the same owners by the Asano Shipbuilding Company, of Tsurumi, near Yokohama.

The vessel is of the shelter deck type with long bridge, forecastle and poop. The hull is sub-divided by means of six water-tight bulkheads giving, in addition to the usual fore and aft peak tanks, two cargo holds forward and two aft, the propelling machinery being placed amidships. There is a double bottom running the entire length of the hull, this being employed for the storage of oil fuel, and also for water ballast. The officers' quarters are situated on the bridge deck, with the exception of the captain's cabin, which is on the navigating bridge, and the crew are berthed in spacious quarters in the forecastle.

The principal dimensions are as follows:

Length, between perpendiculars	400-ft. 0-in.
Breadth, moulded	53-ft. 0-in.
Depth, moulded	32-ft. 0-in.
'Tween deck height	10-ft. 0-in.
Gross tonnage	5,479 tons.
Load draught	25-ft. 9-in.
Dead weight carrying capacity	8,800 tons
Designed speed at sea	11 knots



The "Biyo Maru," the first Japanese-built Electrically-propelled Steamer

Propelling Machinery

Particular interest attaches to the propelling machinery of this vessel. It consists of two sets of Ljungstrom turbines, each turbine driving two electric generators. The current from these generators is supplied to two induction motors which drive the propeller shaft through single reduction gearing of the usual double helical tooth pattern. This machinery has all been manufactured by the Svenska Turbinfabriks Aktiebolaget Ljungstrom, at Finspong, Sweden, and its arrangement in the engine-room is shown in the drawing reproduction on page a photograph of the engine-room being reproduced on page . The trubines, of the usual Ljungstrom type, are of the radial flow double rotation pattern, and are designed to work with steam at a present of 225-lb. per sq. in., superheated to 650 degree Fahr. at the inlet valve and exhausting into a vacuum of 29-in. Each turbine has two discs of blading turning in opposite directions, these being coupled to two three-phase alternating current self-exciting type generators having revolving fields.

Each generator is designed to be run at a speed of 3,600 r.p.m. and to give three-phase alternating current of 1,000 volts at 60 cycles per second. Each turbine, with its generators, is mounted on a surface condenser, which rests on a strong steel plate girder foundation. Each of the induction motors develops 1,360 h.p., the normal speed of rotation being 600 r.p.m.

The reduction gearing consists of a large double helical toothed spur wheel and two pinions, each of which is coupled to one of the induction motors. The ratio of reduction is about 7.5 to 1, so that the normal speed of rotation of the propeller shaft is 80 r.p.m., which corresponds to a speed of the ship about 11 knots when fully loaded.

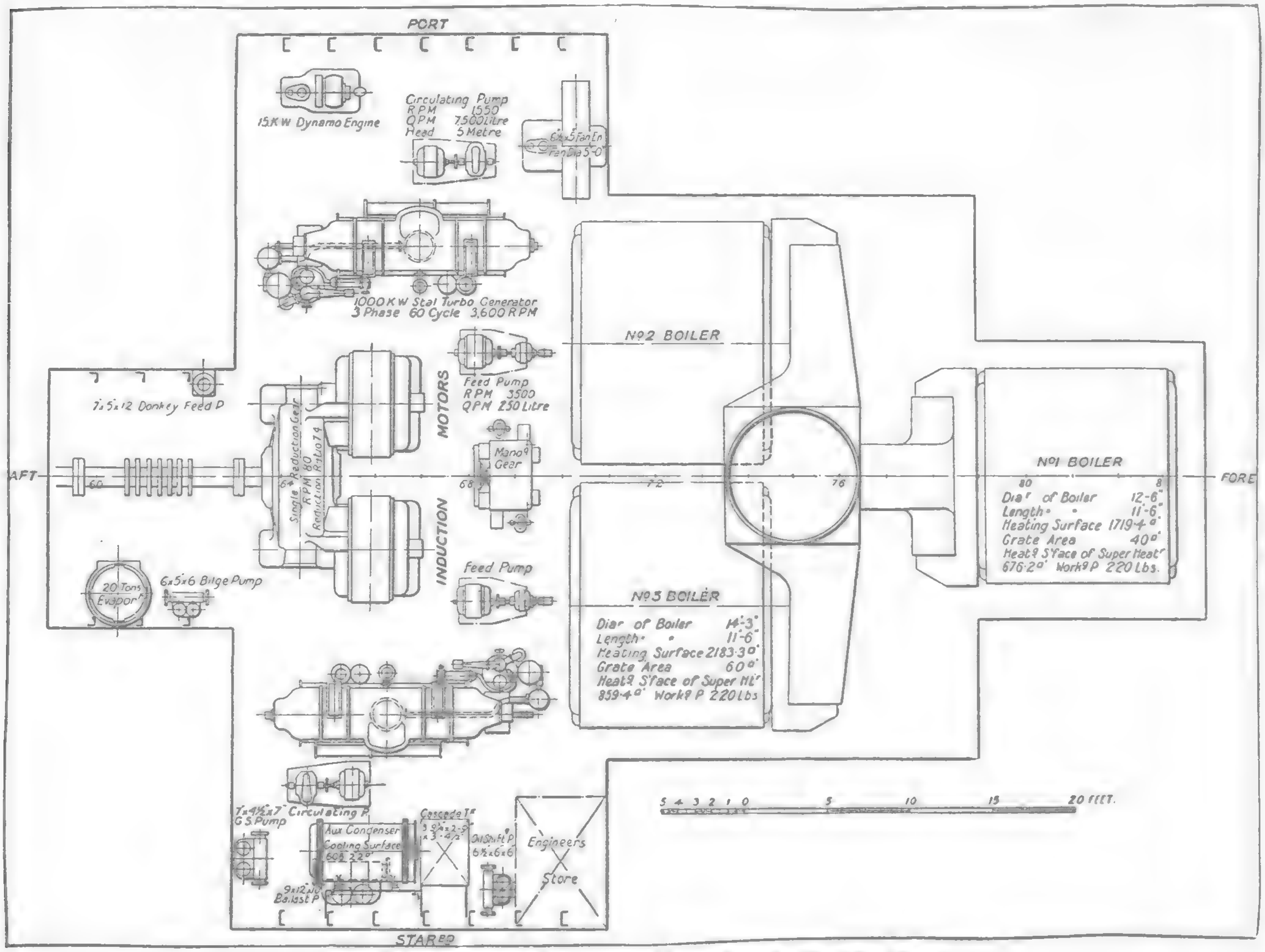
The main manœuvring gear is a rectangular pillar stand containing switches, electrometres, and the liquid type resistance, and is worked with a large hand wheel in the front.



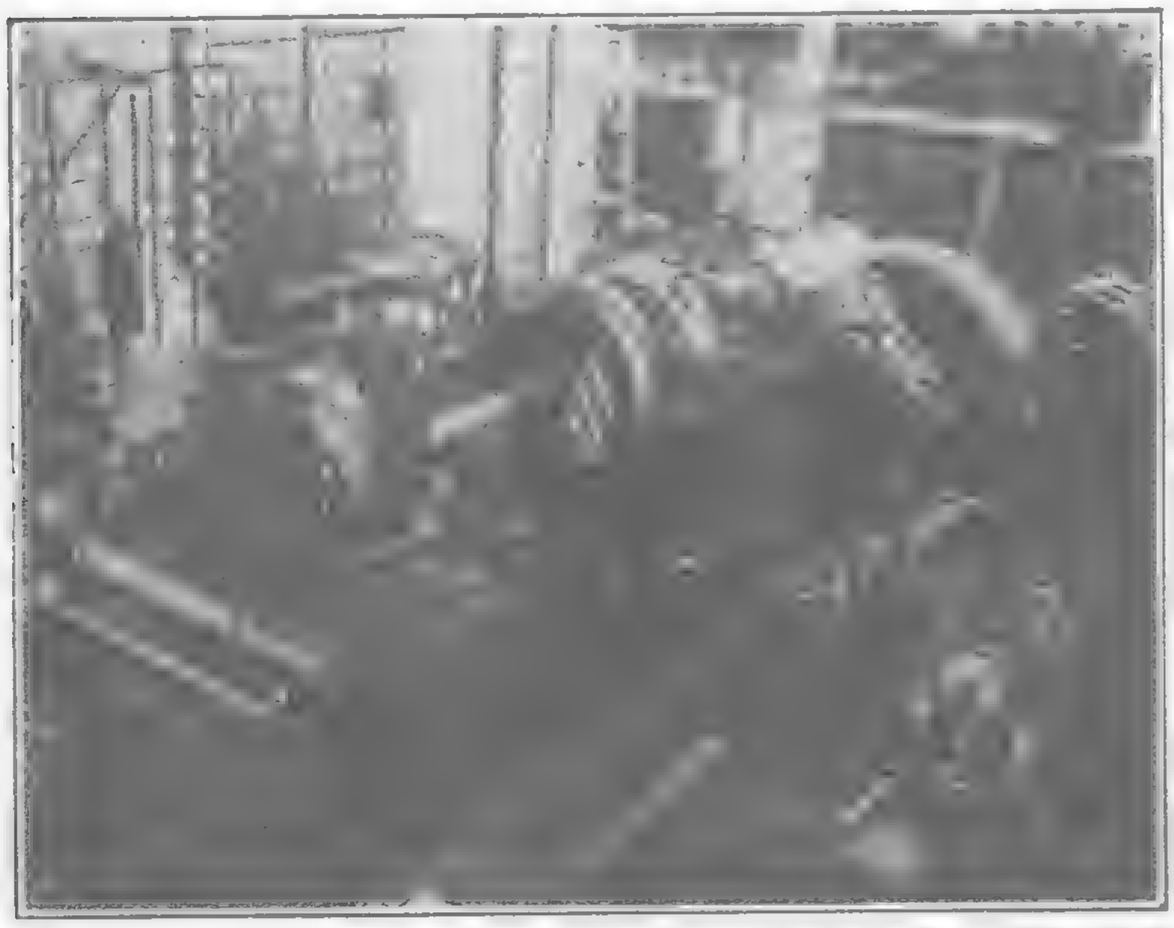
Starboard Turbo-Generator of the "Biyo Maru"

Auxiliary Machinery

The auxiliary machinery is all electrically-driven, each unit being fitted with a separate induction motor taking current from main generators. It comprises two sets of air pumps, operating on the kinetic system, two circulating pumps of the centrifugal type. The other auxiliary machinery in the engine and boiler rooms is steam-driven, and includes the following:—



General Arrangement of Machinery and Boiler Spaces of the "Biyo Maru"



2,500 I.H.P. Turbo-Propulsion Set under Erection



2,500 I.H.P. Turbo-Machinery installed in the s.s. "Pacific"

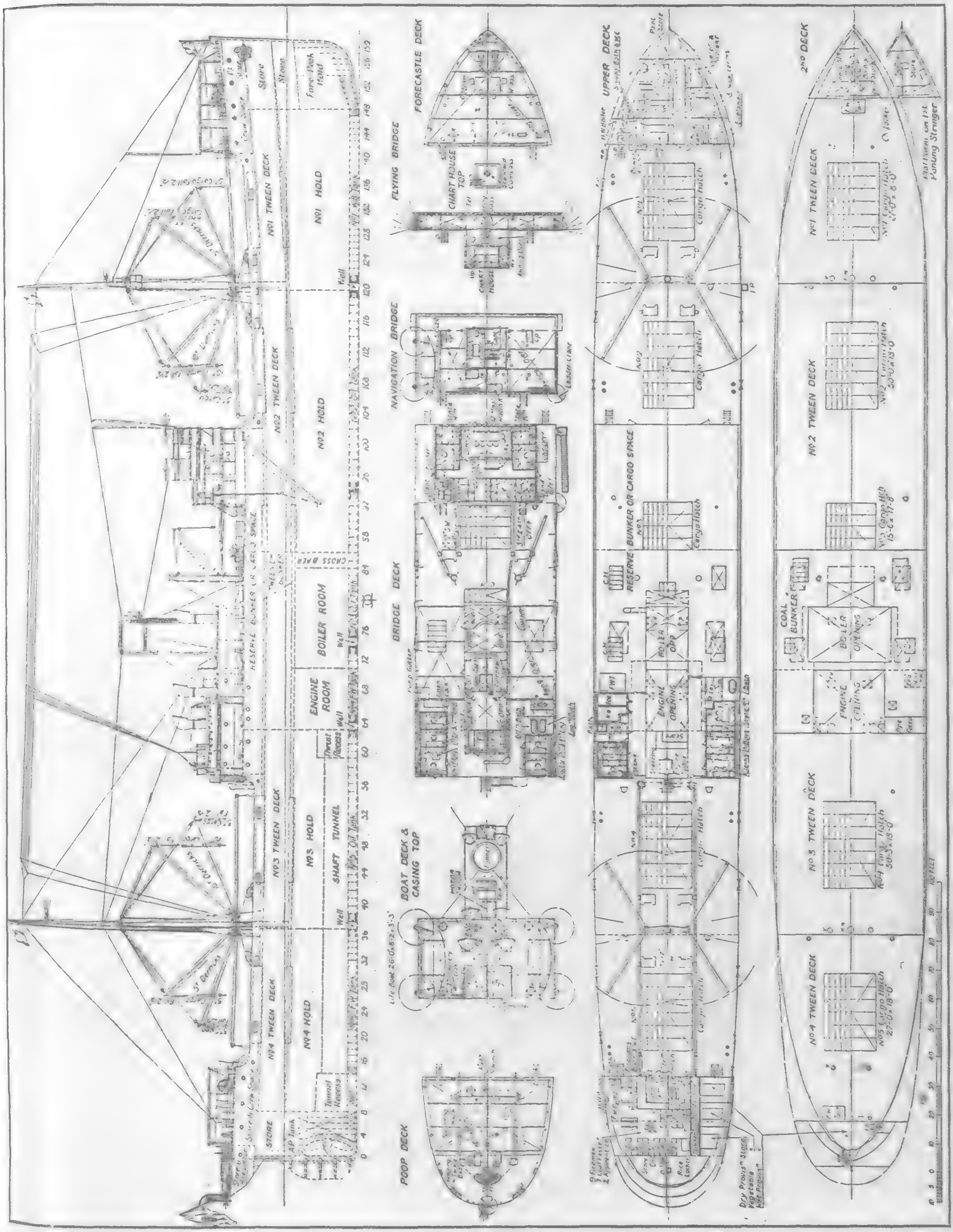
"STAL" (LJUNGSTROM) TURBINE MACHINERY FOR SHIP PROPULSION

One simplex double-acting donkey feed pump, 7-in. by 5-in. by 12-in. one duplex double-acting general service pump, 7-in. by 4½-in. by 7-in.; one duplex double-acting ballast pump, 9-in. by 12-in. by 10-in.; one duplex double-acting bilge pump, 6-in. by 5-in. by 6-in.; one duplex double-acting fuel oil pump, 6½-in. by 6-in. by 6-in.; and a fan engine for harbor use, 6½-in. by 5-in. In addition there is an ash-hoisting engine, evaporator, auxiliary condenser, feed-water heater, feed-water filter, two fuel oil pumps, and a small fuel-oil gravity tank.

The ship is lighted throughout by electricity, and for this purpose there is a motor generator set taking the current from the main generators. There is also a steam-driven generator for harbor use.

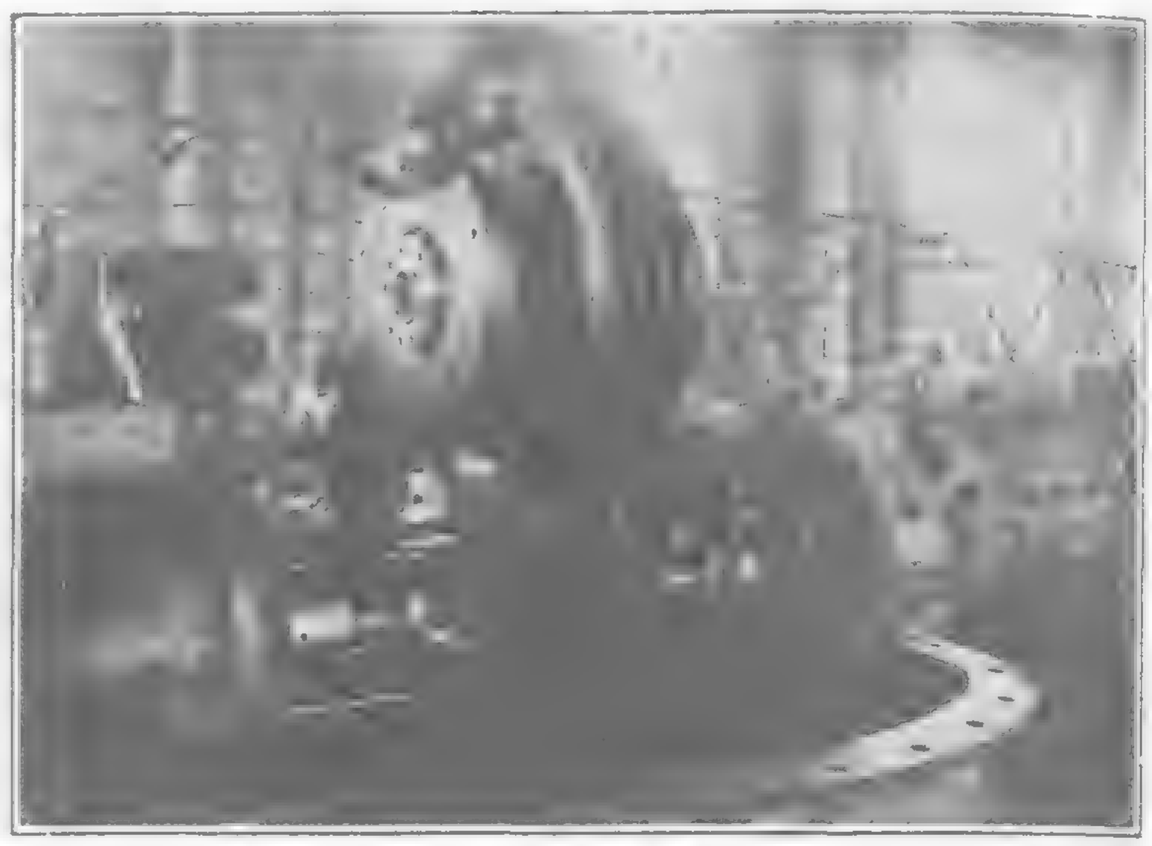
THE FIRST ELECTRICALLY-PROPELLED SHIP IN JAPAN, THE "BIYO MARU"

Built by the Asano Shipbuilding Company, Tsurumi, Japan





A 1,350 I.H.P. "Stal" Turbine for Ship Propulsion



1,350 I.H.P. "Stal" Turbo-Propelling Machinery with the Blading Removed

The propeller is 17-ft. 9-in. in diameter, and with blades having a pitch of 16-ft. 1½-in. The blades are four in number, and are of manganese bronze attached to a cast-iron hub. The thrust of the propeller is balanced by means of a large ball thrust bearing attached to the forward end of the gear wheel shaft, but, in addition, an ordinary horse-shoe type thrust bearing is fitted.

Boilers

Steam is supplied by three single-ended Scotch boilers, two of these being 14-ft. 3-in. in diameter and 11-ft. 6-in. long, having three corrugated furnaces, and one 12-ft. 6-in. long, having two corrugated furnaces. The boilers are designed for a working pressure of 225-lb. per sq. in. gauge, and to burn either coal or oil alone or coal and oil mixed. Howden's system of forced draught is adopted. For this purpose air trunks are led from the generators, the air used for cooling the generators being utilized for forced draught purposes. It is for this reason that the fan engine enumerated above is used only when the generators are not working.

Since the ship was launched, some minor parts of the machinery have undergone changes



The Engine Room of the s.s. "Pacific," 2,500 I.H.P. "Stal" Turbo-Mechanical Ship Propulsion Machinery



1,350 I.H.P. "Stal" Turbo-Mechanical Propulsion Machinery under Erection

as a result of the experience gained by the engineers of the machinery builders who were attending the fitting-out of the installation, but finally early in May, 1921, she went on her trial trips. The results of the trials were very satisfactory, and the vessel is expected to run very easily over 11 knots when fully loaded, with for less consumption of coal than her sister ships, which are fitted with reciprocating engines, and this despite the fact that the *Biyo Maru* has a considerably greater cargo space and consequent increased deadweight carrying capacity in view of her reduced machinery space.

The Toyo Kisen Kaisha were among the first steamship owners in the world to make practical use of mineral oil for steam raising on ocean-going steamers, as they tried this as early as the year 1908. They now have the honor of being the owners of the first electrically-propelled merchant vessel in Japan.

Oil Fields of the Dutch Indies

A RECENT consular report contains the following particulars of the various known oil fields in the Dutch East Indies :—

NORTHERN SUMATRA.—The Peureula (or Perlak) field, in the government of Atjeh, has a dome-shaped anticline, in which over 200 wells have been drilled. The oil-bearing strata were found at depths varying from 100 to 600 metres, the specific gravity of the oil being .770. The water-flush system of drilling was used at first, but later replaced by Canadian machinery and standard rigs. There are two pipe lines (one for oil and the other for gas), which carry the products to the Bataafsche refinery at Pangkalan Brandan, 120 kilometres away. The production in 1900 was 6,978 tons, 286,075 in 1909, 132,560 in 1919, and 129,800 tons in 1920. The concession is owned by the Perlak Petroleum Maatschappij, an independent company with headquarters at The Hague, but the field is operated on a contract or royalty basis by the Bataafsche Petroleum Maatschappij.

The Zuid Perlak concession is owned and operated by the Zuid Perlak Petroleum Maatschappij, of The Hague, also an independent company, but the output is sold to the Bataafsche refinery at Pangkalan Brandan at market prices. The production in 1920 amounted to 8,235 tons.

The Telaga Said field, in the Langkat district, is described as having a petroliferous formation, which is probably of Tertiary age, and consists of a belt of coarse, uncemented blue to grey sandstone of characteristic appearance, interstratified with marls and shales, east of the mountain range, on the slopes of which, as well as ten to twelve miles eastward on the coast, oil outflows abound. The anticline of this field, forming a dome, is about 30 kilometres in length and from 500 to 1,000 metres in width. The specific gravity of the oil is from .765 to .770. The water-flush system of drilling was used in the beginning, but later Canadian machinery and standard rigs have been used. A refinery was built at Pangkalan Brandan in 1891, since much enlarged, to which the oil is brought through pipe lines. The production from this field, however, is very much diminished.

The Boeloe Telang field is on the same anticline as the Telega Said, in the Langkat district, but the oil is heavier, having a specific gravity of .785. The owners of this concession built a small refinery on the Tandjoeng Poera River to take care of their production. In 1915 the refinery was closed down, and a contract was made with the Bataafsche Petroleum Maatschappij to take all of the crude at a reported price of 30s. per ton. All efforts to reach additional supplies of oil at lower levels on this field have failed, and it is believed to be rapidly approaching exhaustion. Various systems of drilling were used, but principally Canadian machinery.



A Sumatra Gusher

THE SOUTHERN SUMATRA FIELDS.—The most important concession in this area are the Moeara Enim, Babat, Soeban Djerigi, Soeban Boeroeng, and Ramok, in the order of their 1920 production. They are all situated in the residency of Palembang.

The Moeara Enim field was brought into production in 1900. The rights were purchased by the Moeara Enim Petroleum Mij., which company built a refinery at Pladjoe, on the Moesi river, a short distance below the town of Palembang. A pipe line was built from the wells to the refinery, a distance of 160 kilometres. The company finally came under the control of the royal Dutch group. The highest production in this field was reached in 1906, when 151,035 tons were obtained. In 1918 the production was 88,235 tons, but had increased to 104,376 tons in 1920. The field is described as being a long anticline, with petroliferous strata at depths varying from 100 to 600 metres. The specific gravity of the oil ranges from .780 to .807. Canadian and standard rigs were used, and over 200 wells were drilled, most of them producers.

The Babat field was also brought in by the same company. This area lies along the Moesi river, about 150 kilometres above the town of Palembang. It came into operation in 1901 with both flowing and pumping wells, the yield during the first year amounting to 3,730 tons, increasing to 70,690 tons in 1916, and decreasing to 59,475 ston in 1920. The oil is piped to the refinery at Pladjoe. The field is dome-shaped anticline, the oil-bearing strata being at a depth of from 25 to 200 metres. The specific gravity of the oil is .800. The machinery used in the development was largely Canadian.

The Ramok concession first came into production in 1910 with 152 tons, which had increased to 14,120 in 1920. The oil strata are



Lucy Rotary Well Driving Installation at Soengei Doea



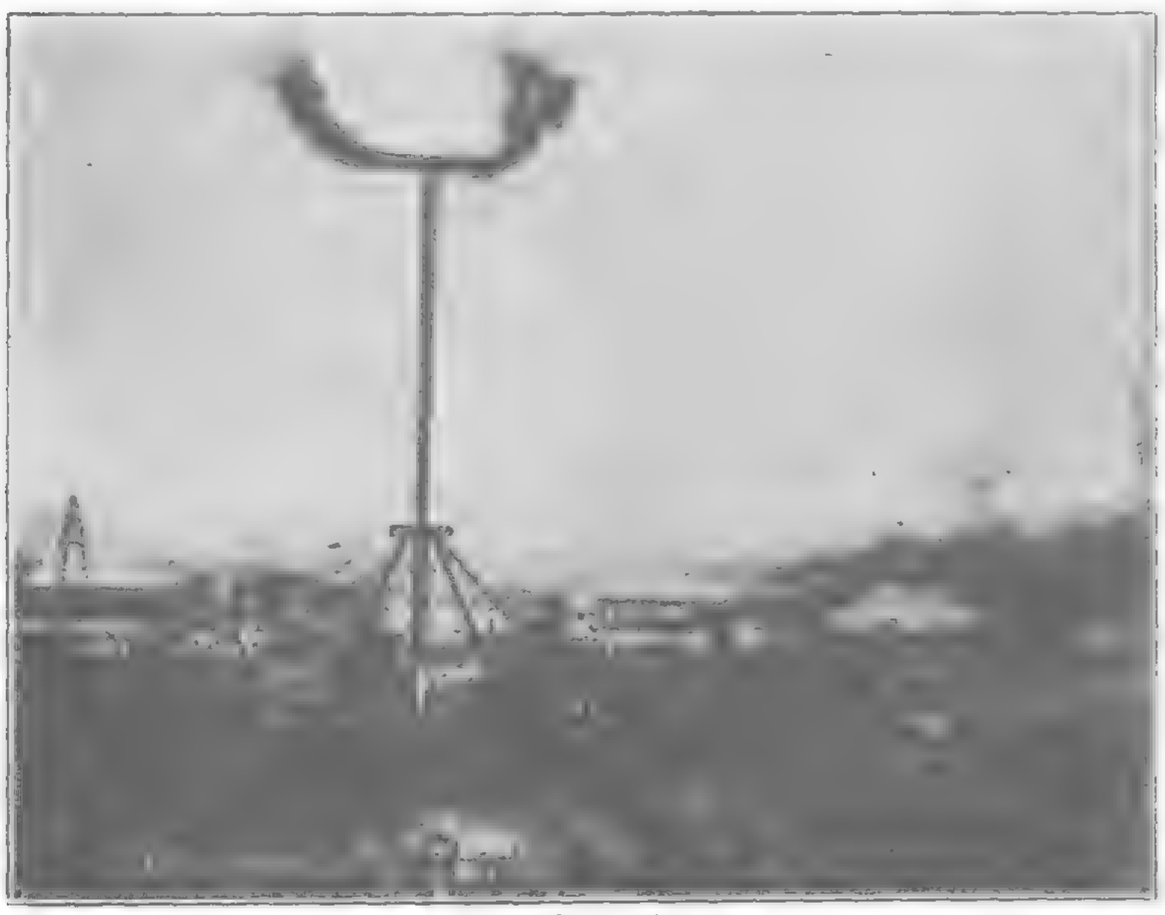
Petroleum Can Filling Apparatus at Pulau Brandan

much the same as in the Moeara Enim area. The specific gravity of the oil is .790, and the production is piped to the Bataafsche refinery at Pladjoe. Canadian machinery and standard rigs are used.

The Soeban Djerigi concession began production in 1905 with 23,266 tons, increasing to 133,695 tons in 1909, decreasing to 44,815 tons in 1914, and increasing to 66,103 tons in 1920. The oil-bearing strata vary from 100 to 500 metres in depth. The specific gravity is .770, and the oil is piped to the Bataafsche refinery at Pladjoe.

The Soeban Boeroeng concession first produced in 1914, when 340 tons were recovered. In 1920 the production was 53,329 tons. The specific gravity is .780; and the oil is piped to the Bataafsche refinery at Pladjoe. Canadian machinery and standard rigs were used.

THE JAVA FIELDS.—The most important producing fields in Java at the present time are Tinawoen, Panolan, Made, Djepon,



Burning Earth Gasses

and Twelve Dessas, named in the order of their 1920 production. They, are all situated in the residencies of Rembang and Soerabaja, in the eastern part of the island.

The Tinawoen concession consists of three producing fields on an anticline 1,500 metres long by 600 wide. There are five producing levels, varying from 60 to 340 metres below the surface. Up to 1917 some 184 wells had been drilled, of which 35 were producing in that year. The specific gravity of the oil is .870. The oil is piped to the refinery at Tjepoe, on the Solo river. The production in 1920 was 113,407 tons.

The Panolan concession has a dome-shaped anticline, about 1,800 metres long by 1,200 wide. There are seven producing levels, varying from 85 to 400 metres deep. Up to 1917 some 147 wells had been drilled, of which 90 were then producing. The production in 1900 was 23,536 tons, and in 1920 it had increased to 106,120 tons. The specific gravity of the oil is .850. The production is piped to the refinery at Tjepoe.

The Djepon concession's most important field is the Semanggi, the producing area of which is 1,500 metres long by about 600 wide. There are three producing levels, varying from 80 to 500 metres deep. Up to 1917 there had been 68 wells drilled, of which only four were still producing. The producion in 1900 amounted to 522 tons, which had increased to 25,899 tons in 1920, although over 40,000 tons were produced in 1917. The oil is piped to the refinery at Tjepoe. The specific gravity is .865.

The Made concession, in the residency of Soerabaja, produced 8,696 tons in 1905, 29,589 in 1919, and 31,758 in 1920. The oil is much heavier than the Sumatra product, varying from .830 to .890 specific gravity, and it is piped to the refinery at Wonokromo, near Soerabaja city.

The Twelve Dessas concession, also situated in the same residency, had a production in 1900 of 13,231 tons, 17,918 in 1918, and 19,031 in 1920. The oil is approximately of the same specific gravity as that of the Made concession, and is piped to the refinery at Wonokromo.

All of the above concessions and the two refineries are operated by the Dordtsche Petroleum Maatschappij, a subsidiary of the royal Dutch group. The N.I. Kolomiale Petroleum Mij., in which Americans are interested, have two producing concessions in the residency of Rembang-Petak, whieh produced 3,069 tons in 1920, and Tremboel, from which 562 tons were obtained in 1920.

THE DUTCH BORNEO FIELDS.—There are five important fields in this area, three of which are the largest producers of crude in this Colony—Louise, Tarakan I., Tarakan II., Nonny, and Moeara—all operated by the Bataafsche Petroleum Maatschappij, a subsidiary of the royal Dutch company. The onere finery in this district is also owned by the Bataafsche, and is located at Balikpapan, on the east coast of Borneo. The Borneo oils are very heavy, varying in density according to the depth of the layers. The specific gravity of the top sand is .963, the middle sand .860 to .890, and lower sand .856. The Tarakan oils, however, are used for liquid fuel, and have a density of .980.

The Tarakan concessions are situated on the island of that name, off the east coast of Borneo. They came into production in 1906 with 8,065 tons, which has steadily increased until the two areas produced over 800,000 tons in 1920. The product is used almost exclusively for liquid fuel, the only process necessary for its direct use being a simple electric method for removing the slight amount of water which may be in the oil. The concessions are owned by the Tarakan Petroleum Maatschappij, and leased for operation to the Bataafsche Petroleum Maatschappij at a rate of fl.1.25 per ton.

The Louisa concession forms part of the Sanga Sanga anticline, the petroliferous strata being that described above, Between 200 and 300 wells have been drilled in this field, Canadian machinery and standard rigs being used. The production in 1916 amounted to 461,923 tons, 398,841 tons in 1917, 488,359 tons in 1919, and 454,387 tons in 1920, all of which is piped to the Bataafsche refinery at Balikpapan.

The Sanga Sanga Dalem field has an anticline some 90 kilometres in length, forming domes at two places.

The Noni (or Nonny) concession covers one of these domes at Sambodja, which produced, 1,180 tons in 1910, 198,199 tons in 1916, 152,559 tons in 1917, and 186,740 tons in 1920.

The Moeara concession covers an extension of the Sanga Sanga Dalem dome. Production was begun in 1902 with 1,366 tons, increasing to 77,595 tons in 1913, and 102,992 tons in 1920. It is operated by the Bataafsche on a royalty basis. Two new wells were brought into production on this concession during 1921, one with a capacity of 6,000 barrels per day and the other running 2,500 barrels daily.

Osaka to Have Model Public Market

With a view to relieving the high cost of living in Osaka, the Osaka municipality intends to establish a large modern market, where all sorts of daily necessaries will be sold at the lowest possible prices. A ground covering about 15,000 *tsubo* has been allotted for the purpose in Sakura-nomiya and the ferro-concrete buildings will cover an area of over 6,000 *tsubo*.

The market will be equipped in a most up-to-date manner in all respects, while arrangements will be made for the quick transportation of goods to the market from different parts of the country, by the use of the present Joto Government Railway and also of a number of motor boats on the many canals of Osaka.

The municipality has already filed an application with the central government for the loan of Y. 2,800,000 at a specially low rate of interest, which will constitute part of the funds for the above market.

Teak Milling in Siam

BY far the greater part of the forest concessions in the teak forests of northern Siam are in the hands of five European firms: The East Asiatic Co., Ltd., The Borneo Co., Ltd., The Bombay-Burmah Trading Corporation, Ltd., The Anglo-Siam Corporation, Ltd., and Louis T. Leonowens, Ltd. Most of the smaller teak concessionaires sell their logs to the mills run by these companies at Bangkok, although a few, the most important among them being Wing Seng Long & Co., operate small mills of their own. Great commercial jealousy exists between the teak millers at Bangkok, and the mills on the Menam are closely guarded lest some trade secret be stolen by a competitor.

Most of the teak trees are felled in the vicinity of Chieng Mai, northern Siam, and 75 per cent. of the logs are floated on tributaries of the Menam, sometimes taking years to reach Bangkok. About 25 per cent. of the logs float into the River Salwin, which empties into the Bay of Bengal at Moulmein. The Siamese government maintains a station at the mouth of this Burma river, in order to collect tribute of logs felled in Siamese forests.

A new concession, said to be extremely rich in large teak trees, has recently been granted the Est Asiatique Francais at Chieng Rai, near the French frontier. As the forests are situated about the head water of the Mekong, logs felled here will be floated to Saigon for milling.

The Siamese government has recently announced its intentions of raising the royalty on teak logs by 200 per cent. The present royalty varies with the size of the log, but approximates Tics 4 per log. Bangkok teak millers immediately entered a protest, and hope to compromise on a 100 per cent increase.

The milling of hardwood other than teak is done chiefly by the East Asiatic Co.'s mill at Bandon, and The Sriracha Co., Ltd., at Sriracha. The latter mill is considered one of the best equipped mills in the East.

During the year ending March 31, 1921, sundry harwoods exported amounted to Tcs. 1,957,683 against Tcs. 12,339,720 worth of teak. The exports of teak for three years are tabulated as follows:

Year Ending March 31,	*1919*	*1920*	*1921*	*1922*
Quantity (tons) ..	36,931	70,202	71,617	
Value (ticals) ..	5,597,409	13,420,966	12,349,720	7,111,000

Siam teak experts attribute the slump in the teak market partly to the Washington treaties, as battleship builders were large consumers of teak.

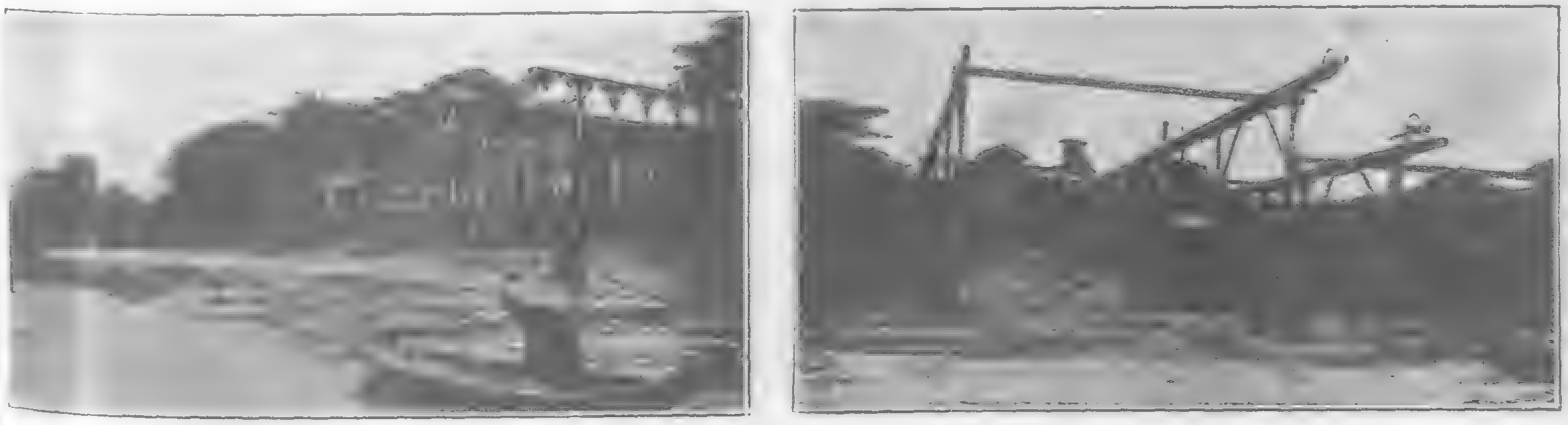




Saw Mill of the Bombay-Burmah Trading Corporation



Thye Hong Seng-Saw Mill



Teak Saw Mills of the Borneo Company at Bangkok

In the Land of the Roko

(THE FIJI ISLANDS)

Successful Administration. The Story of Thakambau. Development and Industries. The Natives. The Rokos, and Nandis. Native Government. Kava. The Meke. The Leper Island of Makongai. The Indian Settlers.

By THOS. J. McMAHON, F.R.G.S.

THE British government has been most successful in its administration of the Fiji islands. Many administrators, supported by energetic officials, have done much in promoting progress. Undoubtedly a sane policy has been maintained giving every scope to commercial development, while thoroughly protecting the interests of the natives. Nevertheless, Fiji is to-day in the throes of many problems. The white settlers are seeking freedom from official government on dominion lines. The natives civilized and educated are bidding for employment equal to their progressive status. The Indian settlers introduced 48 years are openly in revolt, and are demanding equality with the whites.

Fiji is one of the least taxed portions of the British empire, its national debt is trifling, its revenues modest in amount. And yet no island group of the South Pacific is more up-to-date in roads, wireless, cables, telephones, post offices, hospitals, schools, light-houses, transport, and other public services.

The administration has excelled in the care of the natives. Fifty years ago the Fijians were savages and cannibals, to-day all are civilized and christianized.

Fiji consists of 250 islands, 90 of which are inhabited, the total area being 7,000 square miles. There are two large islands, Vitilevu, 4,000 square miles, and Vanua, levu, 2,500 square miles. The other islands are small, but every one has a wonderful commercial value.

Fiji holds a very central position in the South Pacific, it is about equal distance from Asia, America and Australia. Suva the capital, and a fine modern city, with a magnificent harbor is like to become the half-way house of South-sea shipping.

The islands of the group are remarkably mountainous, having an important bearing on the climate, which is wonderfully cool, and healthy, the death-rate is reckoned the lowest in the world. Malaria and other tropic ailments are quite unknown.

Fiji is fast gaining a reputation as a paradise of the tourist. Mountain and river scenery particularly grand. The riding of the rapids at the heads of rivers, and in frail canoes expertly managed by natives is a thrilling experience. The natives are a picturesque race of agreeable manners, their customs and ceremonies are especially attractive.



Typical Head of a Fijian



In the Sugar Field of Navua, Fiji Islands

The name of Thakambau is ineffecably written on the traditions of Fiji. In the chief city, the European settlements and the native towns there are numerous Thakambau streets, avenues, houses and institutions. Half a century ago Thakambau ruled Fiji, his name and deeds were respected throughout the South seas. He was a man of majestic figure, and most impressive commanding personality. From a mere chief of a small island and tribe, with an army of giants like himself he conquered the whole of Fiji, and set out to conquer the island groups of the South Pacific. This he did not accomplish but he succeeded in making the Fiji islands the most progressive of the South seas. He encouraged the settlement of the whiteman, and favored every kind of enterprise, but no monarch was so autocratic; he would suffer no interference with his authority. The commercial progress of the South sea kingdom brought to the king liberal revenues. Thakambau was an extravagant monarch, he delighted in rich foods, many palaces, grand furniture and splendid dress. On public occasions he would appear in a purple robe and a massive gold crown. But a day came when the revenues declined, and then serious differences arose with his subjects, culminating with an open quarrel with the American consul. The consul accused the king of inciting his native people to seize American traders' property. Thakambau denied the accussation, and the natives rose to support their king. In the midst of the hubbub the consul's house was burnt down, the consul demanded 40,000 dollars in reparation. The American home government eventually interfered, and sent a war vessel to enforce the consul's claim. Thakambu invited the British government to protect him and his people, this was refused. For some months it looked as if the Fiji islands were to pass to American ownership, when relief came to the king in two forms. A rich Australian trader paid the 40,000 dollars, and the British government after repeated petitions from the king decided to take over the Fiji islands. The first British administration was set up in 1874, and King Thakambau retired on a liberal pension to the royal island of Bau.

Development since British administration has been energetic. Travelling through the islands it is impressive to witness the variety of traffic, the stretches of settlements of whites, Fijians and Indians, the



A Fiji Islands Railway Train



Lautoka the Headquarters of the Sugar Industry of the Fiji Islands



Fijian Police on March, Fiji Islands



The Broadway of Suva the Capital of the Fiji Islands



A Native Parliament, Fiji Islands



A " Meke " or National Dance, Fiji Islands

vast areas of sugar cane, the number of sugar mills, the hundreds of miles of light railways, the fine steel bridges over the great rivers.

The trade of the group is estimated at six millions sterling annually. The products are sugar, coconut, bananas and cattle. The cultivation, milling and export of sugar is the main industry, and is on a vast scale, managed on most modern conditions. The cultivation of the banana is interesting. This fruit was introduced but it instantly took on such a wonderfully rich flavor that ever since it has been termed the "Fiji" banana. Banana plantations are owned by whites, Indians, Chinese and Fijians, and altogether cover many thousands of acres. Up to twelve months ago the chief export was to Australia, but a tax upon the export, in order to protect Australian banana growers abruptly ended the trade. This was promptly taken up by New Zealand and America. Not only are bunches of bananas exported but there is a rapidily increasing trade in preserved bananas and banana flour.

Whole islands are given up to the cultivation of the coconut, and many thousands of tons of copra are exported every year, the planters being exceedingly wealthy.

Small as is the extent of Fiji it has some of the richest pasture lands of the Southern Hemisphere. Cattle and sheep do well. A big meat works is being erected, and dairying is being carried on most successfully.

The natives of Fiji have a race individuality, and so many superior characteristics that they are certainly one of the most outstanding native peoples of the South seas. The common folk are possessed of a natural politeness, and dignity; the chiefs of a refinement which is unmistakable. There are 85,000 Fijians, a clean, wholesome people. Most are employed in native industries, the tilling of their gardens, many of the men owning banana, coconut and sugar planations, or work for the white men on theirs. Several Fijians hold responsible administrative positions, such as police, many are clerks in business establishments, and many are employed by the government and missions as teachers in schools. The Fijians while loyal to the British administration have a faithful reverence for their own Fijian royal family. The present representative is the Ratu Popee, a grandson of Thakambau, most cultured gentleman. Popee lives on the island of Bau in a large native "Bure" or palace, and receives guests in a drawing room furnished in the most approved European style and taste.



In a Fiji Banana Plantation

The Rokos or native princes are the heads of the native self-government, and are responsible to the British government for the welfare of the people. These princes are always well educated men, and have a powerful influence with the natives.

Up to recent time the women of Fiji were regarded as little better than slaves. It is a very evident sign of the civilization of the Fijians that the women are now accepted as equals. The Nandis or princesses have done much for the upliftment of the women. The Fijian woman no longer lives in neglect, she beautifies her home, dresses well in European fashion, and cares for her children in a very sensible manner.

Many Fijian customs are dying out, the younger generation are throwing off the yolk of the unprogressive custom of communism. The general ownership of wealth, food, clothing and effort is not consistent with progress, and the young Fijian is out for personal prosperity, much to the annoyance of the old men and women.

Native towns are very modern in many respects, they are laid out with streets, have water supplies and sanitation is enforced. The chief of a town is called a "Mayor," and there is a kind of municipal government which stands for progress.

The islands inhabited in the Fiji group are divided into provinces, districts and towns, and this for the interesting self-government of the natives. A Roko rules a province, a "Buli" or minor chief a district, and a "mayor" a town. The people of a town send representatives to the municipal council, this council sends representatives to the district councils, and then finally the districts send one or more representative according to population to the native parliament of the province.

A parliament is held once a year in some big town of a province, and is an imposing affair attracting thousands of natives—men, women and children, when after the closing of the parliament



The Making of Tappa or Native Cloth by Women, Fiji Islands



The Women's Quarters of the Leper Island of Makongai Island, Fiji Islands

there are great festivities for several days and nights.

A Fiji parliament is not unlike any other parliament, there is a chairman and clerk, there is much discussion on the matters of roads, schools, hospitals, taxes and the native health, the deliberations being forwarded to the British governor of Fiji who approves or disapproves as he thinks fit. The opening ceremony of a parliament is carried out with wonderful ceremonies. There is much drinking of "kava," most elaborate native dressing in tappa or native cloth, leaves, and flowers, there is much native singing, and speechifying.

No ceremony is complete in Fiji without the drinking of "kava," the native grog. This compounded from a shrub called "Yangona." The roost are crushed and mixed with water and frequently strained through a thick fibre cloth. It has a yellow-green appearance, and no particular taste. The natives drink it excessively, and many white people, long residents in the group, commend it for its medicinal qualities. In presenting a cup of "kava" a Fijian kneels and while the drink is being swallowed vigorously claps hands. An empty cup is never returned but is sent spinning into the middle of a room, the more it spins the more it shows appreciation of the compliment of being offered the drink. To be offered a cup of "kava" by a Fijian woman is the highest compliment that can be paid by Fijians.

As "kava" is the national drink, so the "Meke" is the national dance or entertainment of the Fijians. A "Meke" may be described as a legend told in song and dance. It might be of some famous tribal battle of the olden days. Hundreds of handsome young natives robbed in the most gorgeous manner take part, holding either spears or clubs, go through, with wonderful agility, grace and precision, the movements or actions of battle, and which may last for an hour or more. Women supply vocal music, by no means tuneful, but in which time is well marked.

Among the islands of the Fiji group is one of rare beauty, possessed of a remarkably healthy and untropic climate, and is known as Makongai. Here is a leper establishment where all the lepers white, yellow and black are gathered from all British South sea islands. The island is laid out in lovely gardens, and the lepers are treated in the most scientific and humane manner. Cures are frequent, and so rapidily and thoroughly is the disease of leprosy being stamped out that it is estimated in another ten years there will be no lepers in the South seas, or at least in the islands under the British.

There are in Fiji 61,000 Indians, and the number is increasing, and despite the fact they are a discontented, unhappy people. It is difficult to understand the causes of their discontent, poverty among them is quite unknown and even impossible. How prosperous they are the following details will plainly disclose:—

Some of the richest men of Fiji are Indians. In every Indian settlement are scores of Indian storekeepers, tradesmen all doing well, sharing the earnings of the Indian workers of the sugar and banana industries. An interesting evidence of Indian wealth is the quantities of jewelery worn by the women, children and often the men. It is quite common to see women weighted down with jewelery worth hundreds of pounds. The popular fashion is a necklet of Australian sovereigns, 25 and more a necklet. Tiny children can be seen playing in gutters wearing these necklets of 10 to 12 sovereigns. Every Indian owns either a motor car or a horse sulky. The owners of racehorses are mostly Indian young men.

The following particulars should prove interesting. In five vessels leaving Fiji in 1920 for India carrying only Indian passengers visiting their homeland, there traveled 4,751 adults, 1,906 children, having remittances equal to £196,389, jewelery valued at £31,891, and cash in hand equal to £8,054.

The details furnish the best evidence of the condition of the Indians in Fiji. They give the lie to the reports scattered world wide that the Indians of Fiji were, and are, little better than slaves, and that they were being exploited by the white settlers particularly the sugar companies. The Indians, it is significant while agitating against the whites and their enterprises, openly profess they will never be contented until the British government hands over to them the administration of the Fiji islands. The Fijian natives detest the Indians and are agitating that they be dismissed from the islands. With the future hol ds for Fiji is at present doubtful. The Indians are the only obstable to progress, with this obstacle overcome Fiji has a very bright and wonderful commercial future.

Municipal Improvements in Swabue

In December, 1921, the civil governor of Kwantung province directed the transformation of the old Chinese city of Swabue into a modern municipality, and appointed a returned American student (Mr. K. Y. Chan) as chief engineer of the public works department of the city. Work was begun in January, 1922, upon the construction of a 60-foot street running north and south, parallel with the water front, 4,000 feet in length. Another street of similar width, 5,000 feet in length, was begun on April 1. Three other streets are to be constructed.

Two public gardens have been laid out in modern style, with cement walks, fountains, and flower beds, advantage having been taken of all the natural beauties of the site.

Additional plans call for the construction of a wharf at the water front of Swabue, a market place, and a highway bridge (all of concrete) when financial conditions permit.

The city of Swabue is located on the South China coast about midway between Hongkong and Swatow, and is the principal small seaport between these two cities. It has an excellent land-locked harbor, which, however, will only accommodate vessels of shallow draft.

The topographic survey of a highway running north from Swabue to Haifeng city (a distance of about 15 miles) has just been completed. This highway will connect at Haifeng with the Canton-Chaochow highway and will afford a means of rapid and easy communication with both Canton and Swatow. The highway will be built at least 30 feet wide, and will be of modern construction in every respect.

The construction of the streets and highway referred to will be accomplished principally by the use of coolie labor, which is cheap, rather than by the purchase and use of machinery, which is comparatively expensive; but a steam road roller, weighing about 10 tons, will be used on both city streets and country highways, since it s impossible to operate by hand a roller of the weight required. Materials for building the streets and highway are found in abundance in the vicinity of Swabue.

NAGASAKI HARBOR IMPROVEMENT

Nagasaki's new Y.1,500,000 quay is nearing completion and will soon offer better facilities to ships calling at the port. At present cargo and passengers are handled by means of barges and tenders, but the new quay will enable two steamers of 8,000 tons each or of three of 5,000 tons each to anchor along the quay at one time. The frontage is 220 *ken* or a little more than 1,388 feet.

The cost of the quay is being borne by the city, although approximately one-third of the wharf frontage is for the exclusive use of the N.Y.K. for its Shanghai steamers. The depth of water alongside the quay is 30 feet. The widest part, at the extreme left, measures 230 feet. The part, for the use of the Nagasaki-Shanghai service boats, is to be completed sufficiently for the use of the ships by December. The accessory buildings, waiting rooms, ticket office, and baggage rooms are to be completed in February.

The ultimate plan, the completion of which require several years, is to extend this quay as far as the railroad station. The trackage will come alongside to make connections with the Shanghai boats.

Electrical Development in Japan

1. ELECTRIFICATION OF THE IMPERIAL JAPANESE RAILWAYS

By. H. C. Huggins

THE first Japanese steam railway to be electrified was the Kubo Railway Company's line between Nakano, in the suburbs of Tokyo, and Shohei Bashi, in Tokyo city, in 1905, before the line was nationalized. The first electrification project to engage the attention of the national railways was on the line between Yokogawa and Karuizawa, where the slope is 1/15, and in a distance of 6.9 miles there are 26 tunnels. The actual construction of this electric line was begun in April, 1910, and was completed in September 1911. Owing to many imperfections in equipment and minor mishaps during the first months of experimental operation, the completed electric line was not opened to passenger and freight traffic until May 1912.

Karuizawa is the most suitable location in Japan for a healthy; vigor-renewing summer resort. But the difficulties of the railway journey had retarded the growth of the summer community. With the electrification of this line the number of persons traveling to Karuizawa every summer has increased year after year, and the results of the electrification have always been an argument for the complete electrification of the Imperial Government Railways. Before the electrification of this line over the Usui Pass, the speed of trains was six miles an hour, and during 24 hours only 36 round trips were possible. At the present time, the average speed of electric trains is 11 miles an hour, and the average number of round trips a day is 44 ; in case of need 70 trips can be made. The transportation capacity of the line has been doubled. These results are not remarkable, but failure to achieve better results is entirely due to the poor selection of locomotives, and the inefficiencies of the locomotive engineers. The electrification, however, has proved financially most profitable.

The cost of this electrification of the Usui Pass line was extremely high, despite the low prices of materials in 1910. Including the construction costs of power plants, transformer stations, wiring, exclusive of the costs of the locomotives, the total cost of the electrification of these 6.9 miles amounted to Y.1,900,000, about Y.270,000 a mile. This high cost astonished the public, and deterred further attempts to introduce electrification on other lines.

At the time of the electrification of the Usui Pass line the government of the day, the Katsura cabinet, had an ambitious, plan to double-track the entire line between Tokyo and Shimonoseki, changing the gauge of the track from 3-ft. 6-in. to standard gauge, 4-ft. 8½-in. Electrification had not yet begun to impress the public and the politicians as the most profitable advance the nation could make toward the solution of transportation problems. For six years each successive cabinet found itself confronted with the "wide-gauge" problem, and electrification as a policy was practically unknown.

With the organization of the Hara cabinet, the "wide-gauge" policy was definitely abandoned, and the question of electrification as the national policy for improvement of transportation on the government railways again came to the fore as a question of the day.

The first expression of the importance of the question came in a government bill presented to the 43rd session of the national Diet (1919-1920), providing for a semi-governmental corporation to prepare the power equipment which would be needed by the electrification of all the railways. The scheme was grandiose, and was violently opposed by the house of peers. Opposition was so rabid that the bill was hurriedly withdrawn, and the flurried government hastily proposed a plan for the establishment of an electric bureau attached to the department of railways, which would undertake a national survey for electrification, to be carried out eventually by the government railways themselves, without the assistance of private capital.



An Electrically Hauled Train



An Electric Locomotive (inset, its predecessor)

One of the first projects approved in connection with the eventual electrification of all the national lines was the Shinano River power plant, to be built to generate 65,000 kilowatts, for transmission from the North-Eastern district to the Tokaido. The 44th session of the imperial diet approved this plan and the estimates of cost (1920-1921). Later, it was thought advisable to increase the estimates, and this change also met the approval of the diet.

The department of railways now operates three electric power houses, at Yaguchi, Yokogawa and Akabane. The hydro-electric super-power house which is to be built on the Shinano River will be the fourth plant under the department's control. The maximum water head at this power plant will be 3,000 cubic feet per second, and the power yield will be approximately 116,000 h.p. theoretically. This will be the greatest power house in Japan.

The survey of the dam site has been completed, and a light railway for transporting materials for construction has been built

to the dam site from the nearest railway station. Work on this power plant will be completed by March 31, 1927. The power generated will all be transmitted to the Tokyo district, to meet the demands for power which will be made by the electrified railway lines. Until this plant is in active operation the demand for power on the Tokaido between Odawara and Tokyo cannot be met from existing government power plants. The source of power for the new electric section is therefore being thoroughly investigated at the present time. As the line between Odawara and Numadzu through Atami is to be completed by March 31, 1926, the need for power in this section is likely to become acute before the Shinano project is completed.

The first general plan for electrification was also presented to the next session of the diet (45th—1921-1922), the "First Period Project" provides for the electrification of the following ten lines :—

1. Tokyo-Odawara
2. Ofuna-Yokosuka
3. Nakano-Kokubunji
4. Ueno-Omiya
5. Ryogokubashi-Chiba
6. Tokyo-Uyeno
7. Manseibashi-Ryogoku Bashi
8. Kokubunji-Hachioji
9. Kozu-Numadzu

(These nine lines are all in the Tokyo district).

10. Minato Machi-Shijo Nawate-in Osaka.

The first of these lines to be electrified will be those east of Kofu, the Ofuna-Yokosuka line, and the Yokohama-Odawara line, the section between Tokyo and Yokohama along the main Tokaido line having already been electrified, in part. These two lines will be completed in 1923-1924. The tunnel through the Hakone mountains now being built near the town of Atami will be completed in 1924, and the line between Odawara and Numadzu, passing through this tunnel will at once be electrified. This work will be completed in 1925-1926. So that by 1926 the whole main line of traffic between Tokyo and Numadzu on the Tokaido line will be completely electrified.

The complete electrification of the Tokaido line between Tokyo and Kobe is a pet project of the department of railways. The electrification investigating committee has prepared a plan which will be presented at the coming session of the imperial diet, if the approval of the department of finance is first obtained.

The expenditures which have been approved for electrification amount to Y.76,561,000 in all, to be used between 1921 and 1929. The present allotments of funds are as follows :

Expenses of Electrification.

	1921	*1922*
Vicinity of Tokyo	Y.1,238,000	Y.1,304,000
Yokohama-Yokosuka and Odawara..	902,000	902,000
Uyeno-Omiya	265,000	264,000
Yokogawa-Karuizawa..	236,000	236,000
Tokyo-Uyeno	218,000	439,000
Osaka, Minato-machi, Kata-machi, Shijo Nawate	———	236,000
Light and power equipment	492,000	443,000
Communication and signal equipment	2,710,000	2,641,000
Power plants and transformer stations	5,668,000	6,071,000
Total	Y.11,897,000	Y.12,523,000

It is reported that the complete electrification of the Tokaido line alone will cost Y.67,000,000. If the plan of the electrification investigating committee is approved, construction will be begun in 1923, and completed in 1929.

The electrification of the Tokaido line will be a comparatively simple task, once the question of power supply is settled. To equip the present track for electric traffic it is only necessary to provide the wire equipment. It is intended to use a direct current at 1,500 volts highest pressure. The third rail will be employed in tunnels. Accordingly the expense for construction is very light, but the costs of power plants, transformer stations, carriages and locomotives are exceedingly great.

To complete the Tokyo-Yokosuka (in reality only Yokohama-Yokosuka, and Ofuna-Odawara, sections, which are to be opened to business during the 1923-1924 fiscal year, the following sums have been allotted :—

ELECTRIFICATION COSTS FOR TOKYO-YOKOSUKA, AND OFUNA-ODAWARA LINE

Equipment	*1922*	*1923*
Electrification	Y.3,683,000	Y.589,000
Carriages and Locomotives ..	3,140,000	6,866,000
Shops	100,000	—
Total	Y.14,378,000	

The cost of carriages and locomotives is 70 per cent. of the estimates, about Y.10,000,000. According to the estimates of the electrification investigating committee 52 per cent., or Y.35,000,000 of the Y.67,000,000 estimated as the total cost of electrifying the Tokaido line between Tokyo and Kobe, will be required for locomotives and carriages. The kinds of locomotives which will be required are :

Use	Number of Locomotives	Equipment
Special express trains	9	8—250 h.p. motors
Ordinary express trains	46	6—250 h.p. motors
Local passenger and freight trains, and for switching	236	4—250 h.p. motors

Excluding the costs of carriages and locomotives the expense of electrification per mile amounts to only Y.86,000. The construction of power plants is not included in this estimate, but the costs of transformer stations are. The carriage and locomotive equipment costs are proportionately large, but as the estimated costs for improving present steam locomotive equipment on the Tokaido line may be transferred to the electrification account, the added charges on the budget are not prohibitive. It is therefore believed in the railway department that the actual cost of the entire change to electricity on the Tokaido line will fall below the Y.67,000,000 the committee has estimated.

The distance between Tokyo and Kobe on the Tokaido line is 373 miles. As the costs of electrification and rolling stock have already been budgeted for the Tokyo-Yokosuka, Ofuna-Odawara sections, the expenditure still to be approved by the coming diet is reported to be not more than Y.26,000,000.

By the electrification of the Tokaido, and later other national lines, the department of railways expects to make great and sweeping reductions in the costs of operation. The high cost of passenger traffic is the target of much attack just at this time, and a lower passenger fare is expected as one of the results of the electrifications.

Comparing the speed of electric and steam locomotives from 50 to 75 per cent. in time is saved in running passenger trains, and 20 to 46 per cent. in freight train traffic by the use of electric trains. On slopes of 1/40 or steeper, the loads of steam trains must be decreased at least 60 per cent. At present express trains on the Tokaido are pulled over the Hakone mountains by two locomotives at a speed of 15 to 16 miles an hour, carrying a load of 350 tons. This is far below the normal speed and load. With electric locomotives it will be possible to haul 420 tons at a speed of 30 to 35 miles an hour. These figures are normals, but the curvature of the track, and other engineering disadvantages may materially reduce these speeds and hauling capacities. At least the time of transit will be greatly shortened, and this will enable the railway department to operate more trains on the present trackage.

The present traffic on the Tokaido main line, which is double-track between Tokyo and Kobe, is 44 trains a day in each direction. The number of passenger trains is somewhat limited by the hours of day-time traffic, but there is no time limit to the increase in the number of freight trains which can be operated.

The department of railways has estimated the saving which can be effected by the electrification of the railways as shown in the following table :—

COMPARISON OF COST OF POWER ACCORDING TO VARIATIONS IN THE PRICE OF COAL

Price of Coal per ton.	Water power 2 sen per kilowatt hour (Index)	Coal Burning Electric Power per kilowatt hour (Index)	Steam Locomotives per kilowatt equivalent (Index)
Y.5.00	1	1.00	0.74
Y.10.00	1	1.24	1.12
Y.15.00	1	1.60	1.60
Y.20.00	1	1.80	2.00
Y.25.00	1	2.08	2.40
Y.30	1	2.40	2.90
Y.40.00	1	2.90	3.85

(Price of coal, estimated per long ton. Other figures based on (1) as business expense of using water power at 2 sen per kilowatt. Business expenses include interest on construction costs. Table compiled by Mr. Yoshiwara, of the railway department.)

It is obvious that steam power is much more economical than electric power when coal is Y.5.00 a ton. But when the cost of coal rises to Y.10.00 a ton, the expenses of hydro-electric power is about 8 per cent. less than burning coal. With coal at Y.15.00 a ton, the use of hydro-electric power effects a saving of 60 per cent. Estimating coal at Y.13.00 a ton, approximately its present price, the saving effected by using hydro-electric power, is something like 30 per cent. With hydro-electric power at 2.5 sen a kilowatt, there is still a saving of 20 per cent. with coal at its present price. It is estimated that the total amount of coal saved after the entire Tokaido line is electrified, will reach 500,000 tons a year. This will have a most interesting effect upon the whole of Japan's industrial world. But it is doubtful if the coal miners will be so greatly pleased.

The greatest advantage of the electrification from the point of saving will be in the emancipation of the railway department from the fluctuations of profit caused by the ever changing prices of coal. Operating expenses are also greatly decreased, the number of employees required for the efficient operation of electric trains being much less than is needed by a steam train.

It is doubted in some circles, whether the coming diet will approve the plans and estimates for the complete electrification of the Tokaido line, as the policy of the present cabinet, decidedly tends towards economy. But in view of the fact that the electrifications are to be effected from the operating funds of the railway department, not from the general budget there seems no legitimate reason for objecting to the plan as a whole, provided the plan from an engineering standpoint has been reasonably estimated.

With the complete electrification of the Tokaido line the Imperial Japanese railways will have one of the finest railway lines in the world under its operation. Not only from the point of equipment will the line be almost ideal, but there is hardly a railway in the whole world with such wonderful scenic attractions, as the Tokaido on the sections between Kozu and Numadzu, as Numadzn as Shizuoka, and Hamamatsu to Toyohashi.

2. TOKYO CITY'S TRAMWAYS

The surface electric lines in Tokyo city were municipalized in August, 1911. Before that time they were operated by a private company which in turn was a merger of three different systems.

The first public transportation line in Tokyo was built in 1882 by the Tokyo Horse Tramway Co., between Shimbashi and Nihonbashi, through the main part of the business section of the city. Later the same company laid lines between Uyeno and Asakusa and between Asakusa and Shimbashi. In 1897, the Shinagawa Horse Car Railway Co., Ltd. built a line between Shinagawa and Shimbashi and two years later amalgamated with the Tokyo Horse Tramway Co. The merger operated 20 miles of lines, and owned 300 cars, and 2,000 horses. Traffic grew heavier with each improvement in service, and extension of line. The horse cars proved unable to handle the traffic and it was determined to electrify the lines. The company then changed its name to Tokyo Densha Tetsudo Kaisha (Tokyo Electric Tramway Co.), and relaid the track between Shinagawa and Shimbashi. In August, 1903 it was reopened as an electric line.



Track Work on the Tokyo City Tramways in front of the Tokyo Central Station

Many new companies sprang up about this time planning to engage in electric transportation. The Tokyo Denki Tetsudo Kaisha (Tokyo Electric Railway Company) and the Tokyo Shigai Tetsudo Kaisha (Tokyo City and Suburban Railway Co.) were organized and laid new lines. The three companies actively engaged in competing for public support.

During the Russo-Japanese war it became difficult to obtain funds for private enterprises, and at the same time the number of passengers decreased. There was much discussion of a uniform fare for all lines. In September 1906 accordingly, the three companies decided to merge their interests under the name of the Tokyo Tetsudo Kabushiki Kaisha (Tokyo Railway Co., Ltd.)

At the time of the amalgamation there were 89.5 miles of track in Tokyo city, on which 919 cars, including 9 bogie type, were operated. The average number of cars run daily was 642, and the average number of passengers carried was 320,749, yielding an income of Y.10,286, a day.

After the successful outcome of the movement to nationalize the railways an agitation to municipalize the tramways was started by interested persons. Negotiations with the municipality continued for two years and in 1911, the Tokyo Tetsudo K.K., with all its railway, light and power business became the property of the municipality, together with all its rights to construct new lines along routes already approved by the central government. At the time of the purchase the company owned 119.5 miles of track, and operated 1,054 cars. The average number of passengers carried daily in June and July 1911, was 533,456, and the average daily income for the same months was Y.18,468.53.

After the municipalization, the city established the "Electric Bureau" to take charge of the new enterprises. This bureau at once

TOKYO CITY TRAMWAYS

Nearly 500,000,000 passengers were carried in 1921 by the Tokyo Municipal Tramways, a daily average of 1,450,231, providing a gross income of Yen 29,766,901. A total of 1,721 cars are operated on 184 miles of track. In order to meet the pressing transportation needs of the capital, work is now being pushed on 54 miles of new double track. When completed, the number of cars in operation will be 2,050.



View of the Ginza, looking South from the Bridge



Looking North from the Nihonbashi

NIHONBASHI (THE BRIDGE OF JAPAN)—THE HEART OF TOKYO



Crowds Awaiting Transportation at Nigiwai Suda Street, Tokyo



A Busy Tramway Corner in Tokyo

began active building of the 110 miles of lines which were licensed for construction.

The number of trams in operation was also increased, and many re-adjustments of lines and services were made to increase the efficiency of the system.

A careful adjustment of service gave a great impetus to the movement of population within the city, and to the outlying districts. As these suburban districts have grown by the aid of good transportation service, the business of the railways has become increasingly prosperous.



Mr. Hambei Nagao,

President of the Tokyo City Electric Bureau.



Mr. Chikatami Soyama,

Engineer-in-Chief of the Tokyo City Tramways.

However, because of the financial depression which began with the outset of the European war, and the consequent rise of prices in Japan, business expenses of the city railways have been greatly increased. In June 1916 the fare was raised to 8 sen for a single trip, and 15 sen for a return trip. At the same time the labor question began to effect the employees of the electric bureau, and many improvements in their condition were inaugurated by using the increase of income which was obtained from the raise in fares.

The total income of the tramways in 1921 was Y.29,786,901. Expenditure was Y.44,902,624. The number of passengers carried was 448,408,087. The deficiency in income was met by transfers of funds from other accounts, and by bond issues, and the great expenditure was incurred in order to increase the operating lines in the city.

At the end of May 1922, the bureau controlled 183.857 miles of track, and operated 926 bogie cars, 795 small type cars, 1,721 cars in all. The daily average of passengers carried was 1,450,231 for the year, and income was Y.95,935.90. The number of cars operated daily averaged 1,427, and the number of miles run a day was 130,570. The number of employees on the cars and tracks was 11,055.



Mr. Tsutomu Saito,

Director of the Tokyo Municipal Council, Electric Section.



Mr. Genryo Masuda,

Director of the Tokyo Municipal Council, and Electric Section. Former Engineer-in-Chief who designed the present tramway system.

The city of Tokyo has invested in its electric railways Y.105,910,000. The city to cover the costs of the railways up to the end of June, 1922, has issued bonds as follows :

1912 : *Municipal Ordinance Nos. 2 and 3.*

Bonds for Electric Enterprises.

Issued in	Amount Issued	Amount Redeemed
Great Britain ..	£3,175,000	£590,700
United States ..	2,000,000	
France	Frc. 100,880,000	Frc. 8,177,500

Amount Outstanding.

Great Britain and U.S.A. Issues	£4,584,300
France	Frc. 92,702,500

Issue price : G. B. and U. S. A. £93 and £93½.

France .. .. Frc. 92

Annual Interest : 5 per cent.

Interest Paid : March and September ; Term of redemption.

To begin : September, 1916.

To be completed : March, 1953.

1914 : *Municipal Notification No. 2.*

Second Issue Electric Enterprise Bonds.

"I"

Issued in Japan to the amount of Y.10,000,000.

Y.533,500 has been redeemed leaving Y.9,466,500 outstanding.

The yield on issue was Y.93.50.

Interest : 5 per cent., payable in June and December.

Redemption began December, 1921, and will be completed by November, 1937.

"Ro."

Issued in Japan to the amount of Y. 5,000,000.

The yield on issue was Y.90.00.

Interest : 5.5 per cent., payable in March and September.

Redemption began April 1922, and will be completed in May 1954.

1920 : *Municipal Notification No. 68.*

Short Term Bonds for Electric Enterprises.

Issued in Japan to the amount of Y.10,000,000.

The yield on issue was Y.94.00.

Interest : 6 per cent., payable in May and November.

Redemption began May, 1921, and will be completed in May, 1925.

1921 : *Municipal Notification No. 61.*

Second Issue, Short Term Bonds for Electric Enterprises.

Issued in Japan to the amount of Y.15,000,000.

The yield on issue was Y.93.00.

Interest : 6 per cent., payable in May and November.

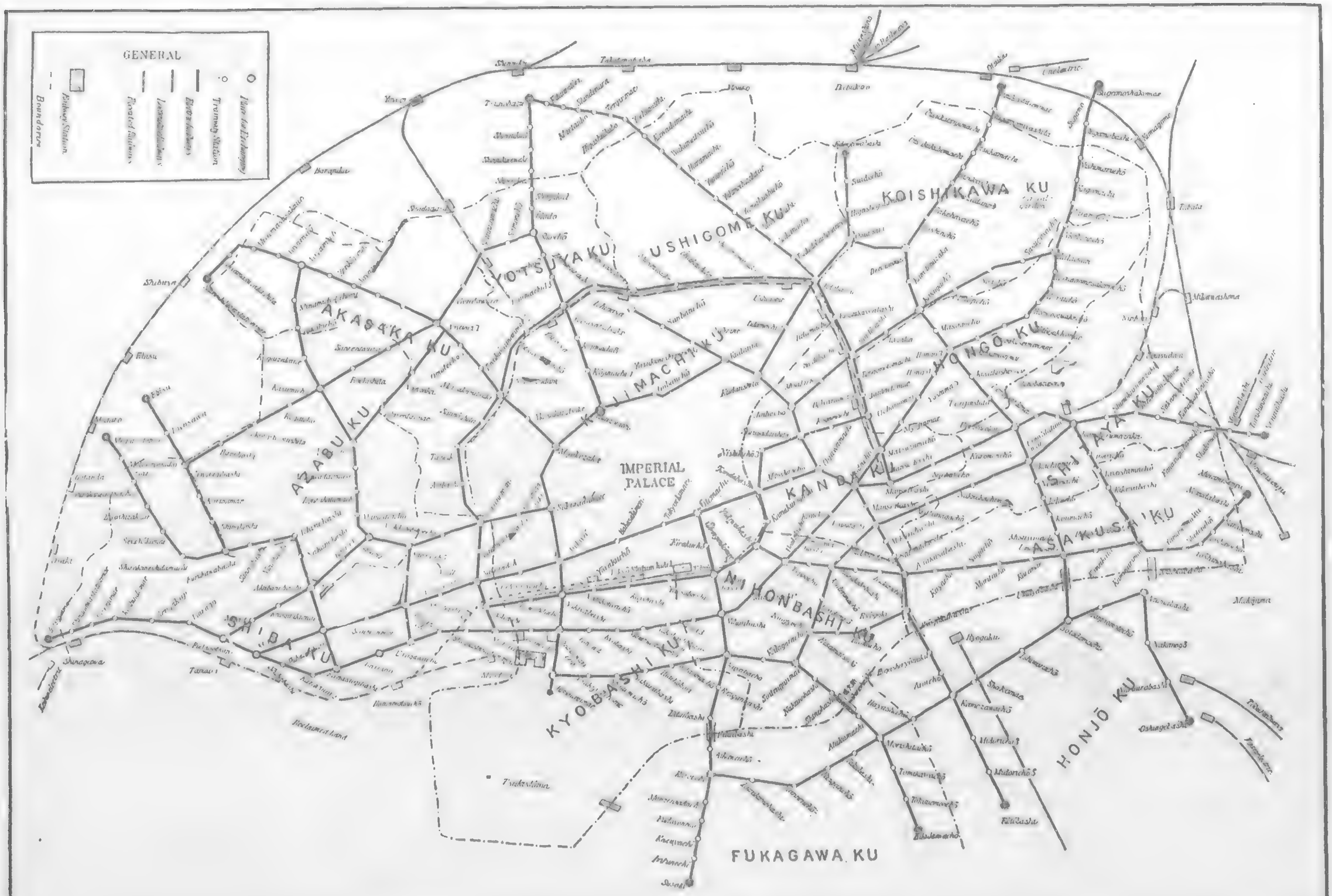
Redemption to begin in April, 1922, and be completed in April, 1926.

The tram lines in Tokyo city are gauge 4 feet 6 inches, and the rails are of various weights, 75.92 and 100 pound rails being the principal weights. The bureau owns 458 wooden wire supports, and 8,894 steel supports, exclusively for the use of tramways. The steel supports were manufactured by the National Company.

Ordinary D.C. Railway motors, manufactured by Dick, Kerr & Co., the General Electric Co., The Shibaura Engineering Works, the Mitsubishi Dockyard Co., are installed on the trams. The small cars are equipped with two motors of 25 h.p. each, and the bogie type cars carry either 2 motors of 35 h.p. each, or 2 of 50 h.p. each.

The city purchases power from the Kinugawa Hydro-Electric Power Co. In May 1922 the city used 220,364 kilowatts, which was handled by transformer stations throughout the city. The city owns a coal-burning power plant at Shinagawa where 5,600 kilowatts are generated for reserve in case of need. The bureau owns 11 car barns in different parts of the city.

SKETCH MAP OF TOKYO TRAMWAY SYSTEM



In 1918 a plan for continuing construction to be completed in 1925 was adopted. Of a total of 86 miles of new lines licensed for construction 54 miles will be completed in the very near future. The old tracks have been greatly improved, and in the important traffic districts have been newly laid with 100 pound groove rails. Old carriages have been replaced on the main traveled lines with the newest bogie type of cars. Bridges throughout the city are being rebuilt so that the trams will not crowd the normal street traffic. The total expense of all the improvements is estimated at Y.132,300,-000, and the funds are being raised by bond issues as the need arises. These bonds are being floated both at home and abroad.

When the work is completed there will be 224 miles of double track tram lines in the city of Tokyo. The number of cars will have been increased to 2,050, of which only 600 will be the small type. The number of transformer stations will be increased to 25, and the number of car barns to 23.

But even when all this work is completed there will remain 32 miles of lines licensed for construction not yet begun. As population increases the traffic grows, and it is expected that work will be commenced on these licensed lines as soon as the widening of the city streets has been effected in accordance with plans recently adopted by the municipality. The municipality will seek new licenses to construct lines along streets now being widened in the most crowded districts.

The population of Tokyo and neighboring towns and villages has grown since 1913 as follows :

	Population	Number of Passengers Carried in Tokyo Trams
1913 ..	2,393,450	245,742,663
1914 ..	2,493,040	257,098,627
1915 ..	2,655,572	261,738,064
1916 ..	2,733,456	264,703,419
1917 ..	2,861,326	296,211,645
1918 ..	2,871,234	336,703,721
1919 ..	2,973,861	395,199,537
1920 ..	3,058,392	400,636,035
1921 ..	3,168,145	448,408,087

3. EXPANSION OF THE TOKYO ELECTRIC LIGHT COMPANY

Japan's Greatest Corporation

The tendency to centralize electric enterprises by mergers and purchases of competing companies is steadily growing more remarkable ; so much so that the electric enterprises in the Kwanto district have practically passed into the hands of the Tokyo Electric Light Co., Ltd.

Since the Tokyo Electric Light Co., Ltd., amalgamated the Nihon Electric Light Co., Ltd., in 1890, this company by February, 1922, when the latest amalgamation of the company was concluded with the Katsuragawa Electric Power Co., Ltd., had annexed or purchased 14 companies.

The greatest number of mergers and purchases of other companies has been carried out since its capital was doubled to Y.100,-000,000 in 1919. The expansion of capital, as well as the advance of its importance became particularly remarkable after 1920. For instance six companies were merged in the Tokyo Electric Light Co., up to the end of 1916, and the consequent increase on capital amounted to only Y.6,770,000. But after 1920 eight companies were amalgamated and the increase of capital was Y.122,990,000.

How rapid has been the recent expansion of the Tokyo Electric Light Co. can be noted from the following facts. The companies either annexed or purchased by the Tokyo Electric Light Co. before 1916 were located exclusively within or around the city of Tokyo. Since 1920, however, the sphere of operation of this company has been extended to eight prefectures, Tokyo, Chiba, Kanagawa, Yamanashi, Saitama, Gunma, Ibaraki, and Shizuoka prefecture, and power is generated and supplied within a radius of 100 miles from Tokyo city.

The following companies have been merged with the Tokyo Electric Light Co., in the course of its history :—

Name	Value accepted	Date of merger.
Nihon Dento K.K.	Y.300,000	Jan. 1890
Shinagawa Dento	225,000	Aug. 1902
Fukagawa Dento	150,000	Sept. 1906
Hachioji Dento	15,000	Jan. 1906
Tokyo Denryoku, K.K. (Power Co.)	6,000,000	May 1907
Edogawa Denki K.K.	80,000	Dec. 1916
Nihon Dento K.K. (another company)	24,000,000	March 1920
Tone Hatsuden K.K.	22,000,000	April 1921
Tone Kido (Tramway) K.K.	240,000	April 1921
Yokohama Denki K.K.	20,000,000	May 1921
Daini Toshin Denki K.K.	5,000,000	Oct. 1921
Takasaki Suiryoku K.K.	8,500,000	Feb. 1922
Kumagawa Denki K.K.	750,000	Feb. 1922
Katsuragawa Denryoku, K.K. ..	42,500,000	Feb. 1922

As a result of these continuous amalgamations and purchases the authorized capital of the Tokyo Electric Light Co., Ltd., reached Y.222,000,000 in October, 1922. Compared to 1890 when the merger with the first Nihon Electric Light Co., Ltd., was made, the authorized capital has increased 500 times. One thing that must not be overlooked in this expansion is that the increase by amalgamation alone has amounted to Y.129,760,000.

In keeping with the expansion of capital, the capacity of supplying power of the Tokyo Electric Light Co., has made a great stride. In November, 1914, on the basis of 100 for November, 1890, the index for power generated had increased to 2,080 ; at the end of May 1922 it had reached 4,600. The fact that the increase in electric lights supplies was only 200 per cent. shows how great has been the increase in the power supply.

(2) *Index of Power and Lights Supply.*

	May end 1916	Nov. end 1919	Nov. end 1921	May end 1922
No. of lights	113	139	238	262
No. of houses	107	118	214	239
Motors (h.p.)	137	296	489	541
No. of houses	128	280	563	614
Power gene. equipment (converted into kilowatts)	496	2,082	3,698	4,604
No. of houses supplied ..	143	500	1,294	1,565

Note.—This study is made on the basis of 100 for November end 1914.

At the end of May, 1914 the Tokyo Electric Light Co. generated 44,000 kilowatts of which only 656 kilowatts were sold to others. During the war the supply of power increased immensely, but as the company then engaged chiefly in supplying power in large quantities only, the number of companies, as well as the area of supply, was not so great as it is to-day. The names of companies and amounts of power they use from the Tokyo Electric Light Co., are given in the following table. May, 1922 :—

Keio Denki (tramway)	500 Kw.
Kinugawa Denki (from main office)	7,650 „
Kinugawa Macbashi branch	5,550 „
Keisei Denki (tramway)	670 „
Akigawa Suiryoku	50 „
Joto Denki (tramway)	100 „
Saibu Kido (tramway)	150 „
Ikegami Dentetsu	100 „
Fuji Gas Beseki	4,000 „

Yokohama Shiden (municipality)	.. ..	750 Kw.
Teikoku Dento (7 places)	.. .. ..	2,255 ,,
Honjo Denki		50 ,,
Ryomo Denki		30 ,,
Azuma Kido (tram)		150 ,,
Sosha Suiryoku		150 ,,
Nishigami Denki		100 ,,
Karasugawa Denryoku		350 ,,
Nihon Denki		120 ,,
Tsuru Dento		580 ,,
Kyoto Denki (tram)		50 ,,
Saitama Dento		600 ,,
Gyoda Dento		350 ,,
Kasukabe machi, Denkibu (town)	.. ..	60 ,,
Chiba Dento		1,270 ,,
Ditto (uncompleted)		300 ,,
Shimotsuke Denryoku (two places)	.. ..	230 ,,
Ishioka Denki		326 ,,
Musashi Dentetsu (railway)		3,500 ,,
Aiko Denki (unfinished)		40 ,,
Kofu Denryoku (ditto)		300 ,,
Tokyo-shi Denki Hyoku		8,500 ,,
Ditto (unfinished)		1,150 ,,
Keihin Dentetsu (rail)		4,200 ,,
Tanimura Dento		30 ,,
Katsura Dento		80 ,,
Gunma Denryoku		100 ,,
Total		44,391 ,,

The power generated by the company's power plants is given in the following table :—

	Capacity in Kilowatts		Power received
Main office	61,600	Reserve : 12,000	33,750
Yoko. prma branch ..	14,525	5,550	9,500
Maebashi branch ..	14,343	—	4,500
Old Katsuragawa ..	30,886	10,000	1,800
Old Takasaki Suiryoku ..	3,355	—	2,000
Old Kumakawa Denki ..	3,657	—	—
Total	128,366		51,550

Note :—This study is made on the figures of end 1921, according to the highest capacity.

The Tokyo Dento supplies 34 large companies with all their power, and their total consumption is 44,390 kilowatts, about one-third of the company's total generating capacity, which is 124,460 kilowatts.

This company is said to be considering amalgamations with many other companies operating in the Kwanto districts. At the present time, in capital, and influence, it is Japan's greatest corporation.

Cement Industry in Japan

DOMESTIC cement manufacturing companies in Japan number as many as twenty-three now, being equipped with Y.43,000,000 in all and they have made such a development that their products will be calculated by 10,000,000 barrels as a unit.

When the economic world was in a prosperous condition, the cement industry began to prosper, though the manufacturing costs rose steadily due to a steep ascent of sundry expenses, but as the demand for cement increased and its market price rose to Y.16 a barrel, the cement industry developed steadily. The market then began to show a downward tendency and the demand for cement suddenly decreased in volume, causing its market price to steadily decline until cement manufacturers were obliged to enter into an agreement for curtailing their products by 30 per cent.

Since last autumn, the tide has turned, not only was the stock of 800,000 barrels quickly disposed of, but its market price reached Y.7.8 a barrel.

The cement production figures for 1921 are still unknown, but it is believed to have amounted to no less than 8,200,000 barrels, and the production of this year is estimated to amount to 9,000,000 barrels.

For the sake of comparison, the following figures of production and sale during the past thirteen years are listed in decimals of 1,000 barrels.

Year	Amount of production	Sold	Carried over to next year
1909 ..	2,541	2,136	771
1910 ..	2,638	2,751	659
1911 ..	3,193	2,370	482
1912 ..	3,804	3,305	981
1913 ..	3,742	3,678	1,044
1914 ..	3,625	3,861	809
1915 ..	3,943	3,943	809
1916 ..	4,495	4,747	557
1917 ..	5,502	5,483	576
1918 ..	6,640	6,758	458
1919 ..	6,445	6,236	666
1920 ..	7,852	7,767	894
1921 ..	[8,300]	7,900	934

(The figure bracketed is a rough estimate.)

As shown in the above table, both the amounts and sales have trebled since 1909, and as for the amount exported it is only about 20 per cent. of the total amount produced.

The countries to which Japanese cement are exported are listed below with the annual exports in decimals of 1,000 barrels.

Year	China	Kwantung Province	British India	Britsh Straits Settlement	Dutch India	Philippine Islands	Hongkong	Total
1913	9.7	101.6	5.9	1.8	0.1	36.5	1.2	156.8
1914	22.1	98.3	19.0	6.8	16.6	72.7	9.7	262.7
1915	51.5	26.6	211.3	41.5	121.1	129.9	9.1	703.8
1916	81.2	69.9	147.1	70.3	192.8	94.9	—	678.7
1917	35.9	62.6	83.3	44.6	263.3	23.8	1.1	528.6
1918	36.0	185.3	78.4	106.1	384.8	82.7	—	907.8
1919	65.5	413.6	92.7	46.9	243.4	130.9	—	1,005.0
1920	80.2	161.4	39.6	64.2	429.2	386.6	—	1,161.2
1921	168.1	178.9	122.1	14.3	311.8	159.6	—	996.2

Chosen Railways in Distress

Without exception, railway companies in Chosen are now in distress, owing to tightness in money circulation. The present state of railway enterprises is reported to be as follows :

1. The lines now in full operation are four in number, including the Zenhoku-Kannan, the Chosen Gas Electric, and the Fusan-Torai Railways.
2. Those with only a part of their construction completed are five, viz., the Chosen Central, the Chosen Shokusan, the South Chosen, the Keinan, and the Tomon Railways.
3. Those now under construction are also five in number, viz., the Sanyo, the Ryoko, the Takurin, the Shinrin, and the Kongosan Electric Railways.
4. Those whose construction has been permitted by the government, and the enterprises launched are three, the North Chosen, the Keishun Electric Railways, and one other.

When the construction of all these railways is completed, the total mileage will reach 1,675.4 miles. But the mileage, now being operated upon, is only 286.7 miles ; while that of lines now under construction amounts to 89.5 miles, and that of those, the construction of which will shortly be begun, reaches 155.6 miles. As to when the remaining mileage will be constructed is as yet unascertainable.

The cause that has brought about these results is the tightness of money circulation in the peninsula. The railway companies are invariably in distress, due to the same reason, as raising funds is now impossible, the shareholders strenuously objecting to paying up, when the market prices of shares are far below the amount already paid up.

Growth of Large Banks in Japan

WITH the commencement of the European war there was more than one precedent smashed in Japan. Business conditions were unprecedented, and the prosperity of the money market also became unprecedented. This development of the money market falls into two parts: the development of organs of circulation, and improvement in methods of transactions. The development of the banks belong to the development of the organs of circulation. The beginnings of the use of call money, the extension of discounts, and the issue of debentures fall under the improvement in transactions. There is naturally a great connection between the two. For instance as the banks developed, their reserves were placed on the money market, and discounts were re-discounted and the proceeds reinvested in the money market. Then as the market developed the banks expanded their transactions. Accordingly if one wishes to understand the development of the money market in Japan during the war, one must study both manifestations. In this article, however, only the development of the banks will be discussed.



The Bank of Japan, Tokyo

The most noticeable feature of the bank history during the war is the decrease in the number of companies engaged in banking business. Before the war there were 52 special banks, semi-governmental institutions, and 1,614 ordinary banks, and 684 savings banks. Of the savings banks, 159 were only savings departments of ordinary banks, so that the number of banking institutions was only 2,155 in all. This seems an extraordinarily large number, but the reason for the existence of so many banks is not hard to discover. It was popularly believed that the banking business in Japan involved no risks to investors, and the business was also socially one in which the sons of gentlemen could engage. The government was also strongly in favor of the establishment of banks, and put practically no limit on the number of licenses it would issue. Furthermore, before the war, there were only a few men in all Japan who were at all capable of organizing and operating great banking businesses, so that the number of small banks was remarkably great.

With the continuance of the war there came a great advance in the commercial and industrial needs of Japan, and great amounts of capital were required almost at once. The government then became urgent in its requests that small banks amalgamate their interests. The number of banks began decreasing every year after 1914.

Year	Special Banks	Ordinary Banks	Savings Banks	Total
1913....	52	1,614	648	1,155
1914....	52	1,593	1,658	2,153
1915....	52	1,442	657	2,153
1916....	52	1,427	664	2,143
1917....	52	1,398	664	2,114
1918....	52	1,375	661	2,088
1919....	52	1,344	656	2,052
1920....	52	1,326	661	2,039
1921....	52	1,329	655	2,036

(This list is from the annual report, 1921; bureau of banks, department of finance. Issued June 30, 1921).

(Savings banks—include savings departments of ordinary banks).

Before the war the concentration of banks was just beginning. But with the continuance of the war, the tendency to amalgamation became more and more conspicuous. At the end of June, 1921, there were 2,036 banks, a decrease of 139, since 1913. Many dissolutions were also carried out in those years but the merging of banks of small capital in large capital organization was the real cause of the decrease in the number of banks effected during the past nine or ten years.

While the number of banks was decreasing the number of branch offices was rapidly being increased. For instance, before the war, the number of branch banks in Japan was 3,153; by the end of 1918, they had increased to 4,181, and to more than 5,000 in 1920. At the end of June, 1921, there were 5,277 branch banks in Japan, an average of 1.5 branches to each main bank in 1913, increased to 2.6 branches in 1921.

Year	Main Offices	Branches	Number of branches to each main office.
1913	2,155	3,153	1.5
1914	2,153	3,352	1.6
1915	2,151	3,430	1.6
1916	2,143	3,731	1.7
1917	2,114	3,891	1.8
1918	2,088	4,181	2.0
1919	2,052	4,589	2.2
1920	2,039	5,097	2.5
1921 (June) ..	2,036	5,277	2.6

Naturally with the increase in the number of banks the amount of capital invested in the banking business greatly increased. Before the war the total capital of all the banks in Japan was Y.886,000,000, the average for one bank being Y.411,000. In 1917 capital had increased to 1,152,000,000, average for one bank, Y.546,000. By the end of June, 1921 the total capital had reached Y.2,696,000,000, and the average capital for each bank was Y.1,325,000.

Year	Number of Banks	Authorized Capital	Average one Bank.
1913	2,155	Y. 886,668,000	Y.441,000
1914	2,153	932,425,000	433,000
1915	2,151	949,303,000	441,000
1916	2,143	971,877,000	454,000
1918	2,088	1,314,408,000	629,000
1919	2,052	1,803,547,000	879,000
1920	2,039	2,643,433,000	1,296,000
1921	2,036	2,696,809,000	1,325,000

Before the War the number of banks with capital of less than Y.500,000 was 1,755 ; at the end of 1920 this number had fallen to 1,046,a decrease of 709. Banks with capital between Y.500,000 and Y.1,000,000 before the war were few in number, in 1913 there were 235, by the end of 1920 there were 497. There were only 165 banks with capital of more than a million before the war, but by the end of 1920 there were 496 banks whose capital was more than Y.1,000,000 and less than Y.10,000,000.

A capital of Y.10,000,000 in any industry in Japan was about the limit of investment before the war. There were only 14 banks, including the Bank of Japan, with that amount of capital in 1913. Excluding the Bank of Japan and the Yokohama Specie Bank the greatest bank in this class before the war was the Fifteenth Bank (Jugo Ginko), with a capital of Y.40,000,000, and the Dai Ichi (First) Ginko, and the Mitsui Ginko had capital of only Y.20,000,000 each. At the end of 1921 there were 43 banks with capital of more than ten millions, while the limit of investment had been pushed up above a hundred millions. Besides the Yokohama Specie Banks, the Mitsui Ginko and the Fifteenth Bank belonged to this super-group.

The greatest part of the loan funds of these banks is in their deposits, but besides the deposits, the capital and reserves are used in the money market. Before the war the paid-up capital of all banks was Y.616,000,000. At the end of 1921 it had increased to Y.1,712,000,000. Bank reserves in 1913 amounted to Y.218,000,000, at the end of 1921 they had increased to Y.591,000,000, an increase of more than 150 per cent.

Year	Paid-up Capital	Reserve	Total	Index.
1913....	Y.616,000,000	Y.218,000,000	Y.834,000,000	100
1914....	645,000,000	237,000,000	882,000,000	106
1915....	651,000,000	255,000,000	906,000,000	106
1916....	678,000,000	274,000,000	951,000,000	119
1917....	776,000,000	297,000,000	1,072,000,000	124
1918....	899,000,000	333,000,000	1,232,000,000	148
1919....	1,209,000,000	366,000,000	1,575,000,000	188
1920....	1,678,000,000	536,000,000	2,157,000,000	258
1921....	1,712,000,000	591,000,000	2,304,000,000	279

Bank deposits in all the banks in Japan before the war, 1913 were only Y.2,211,000,000. They increased to more than Y.5,704,000,000 in 1917, and at the end of June, 1921 they had risen to Y.10,353,000,000. The deposits, paid-up capital and reserves of all banks in Japan amounted to Y.12,657,000,000 at the end of June, 1921. Before the war, 1913, they were only Y.3,045,000,000 ; the increase was accordingly 310 per cent.

Year	Deposits (Y.1,000,000)	Capital	Total (Y.1,000,000)	Index.
1913	Y.2,211	Y.834	Y.3,045	100
1914	2,313	882	3,195	105
1915	2,797	906	3,703	121
1916	3,816	951	3,767	124
1917	5,704	1,072	6,776	222
1918	8,136	1,232	9,368	308
1919	9,777	1,575	11,352	373
1920	9,842	2,157	11,999	406
1921 (June) ..	10,353	2,304	12,657	410

As the amount of money in circulation increased naturally found its way into the central money markets, Tokyo, Osaka and Naogya,the three industrial centres of the empire. At the end of June,1922, the exchange banks in these three cities held deposits of Y. 3,627,000,000 and their paid-up capital was Y.695,000,000 and their reserves were Y.286,000,000, a total of Y.4,590,000,000. Before the war this total was only Y.875,000,000, so that by the end of June, 1922, the increase was 420 per cent.

The capital of the exchange banks in the three great industrial centres, Osaka, Tokyo, Nagoya, before the war was 11.7 per cent. of that of all the banks in Japan. At the end of June, 1922, it had increased to 40.4 per cent. of the total.

THE EXCHANGE BANKS IN THE THREE INDUSTRIAL CENTRES, 66

Year	Paid-up Capital (Y1,000,000)	Reserve	Deposits (Y1,000,000)	Total	Index	Per centage of whole country
1913	Y.161	Y.62	Y.52	Y.975	100	28.7
1914....	208	75	741	1,025	117	32.1
19c5....	202	82	945	1,229	140	33.2
1916....	224	89	1,463	1,777	203	47.1
1917....	264	97	2,328	2,690	307	39.7
1918....	330	117	3,334	3,782	432	40.4
1919....	469	112	3,774	4,355	498	38.3
1920....	624	188	3,599	4,410	504	37.0
1921....	676	242	3,779	4,696	537	40.4
1922....	695	268	3,627	4,590	524	——

The liquid assets of the banks in these three cities at the end of June, 1921, amounted to Y.5,129,000,000, an increase of just 570 per cent. since before the war. They comprised 29.3 per cent. of the assets of all the banks in the country before the war, and 40.5 per cent. after it.

Twenty-two banks before the war had a capital of Y.571,000,000. These banks were the Yokohama Specie Bank, Taiwan Bank, Chosen Bank, Industrial Bank of Japan, Dai Ichi Ginko, Jugo (Fifteenth) Ginko, Dai San (Third) Ginko, Mitsubishi Bank, Yasuda Bank, Kawasaki Bank, Dai Hyaku (Hundredth) Ginko, Mitsui Bank ; These banks in Tokyo. In Osaka there were the Sumitomo Bank, Yamaguchi Bank, Sanjushi (34th) Ginko, Kajima Bank, Konoike Bank, Omi Bank, Kyaku Sanju (130th) Ginko, and in Nagoya the Aichi Bank, Meiji Bank, and the Nagoya Bank. After the war the capital of these 22 banks had increased to Y.3,360,000,000. Before the war their capital was 65.3 per cent. of all the capital of all the banks in the three great industrial centres, after the war it had increased to 71.6 per cent. Compared to all the banks in Japan before the war their combined capital was 18.7 per cent. at the end of June, 1921, it had reached 26.6 per cent. of the whole.

Electric Plants in Fukien

ELECTRIC light plants in the province of Fukien are on the increase. The Kwan Kiáng Electric Light Co. has again increased its capital, and is making plans to supply Lienkiang district electricity by leading wires to it, for which poles are now being erected. The Tungan Electric Light Co. proposed by Wu Shih-hwang, Kienyang Electric Light Co. proposed by Chen Hsiao-sin and Yungtaihsien Sungkowchen Electric Light Co. proposed by Ling Kien-tsing have all purchased necessary machinery from abroad, and are in the course of applying for registration from the government. When once the registration and licenses of trade are granted, work will immediately commence. The Shihma Hwa Tai Electric Light Co. has resumed its operation after a period of suspension through an accident of fire.

The Nanzin Electric Light Co., Ltd. at Nanzinchen, Chekiang, has been licensed by the ministry of communications to supply electricity to the consumers at Chentseh, Kiangsu, a district being about 12 *li* from Nanzinchen.

INDO-CHINA

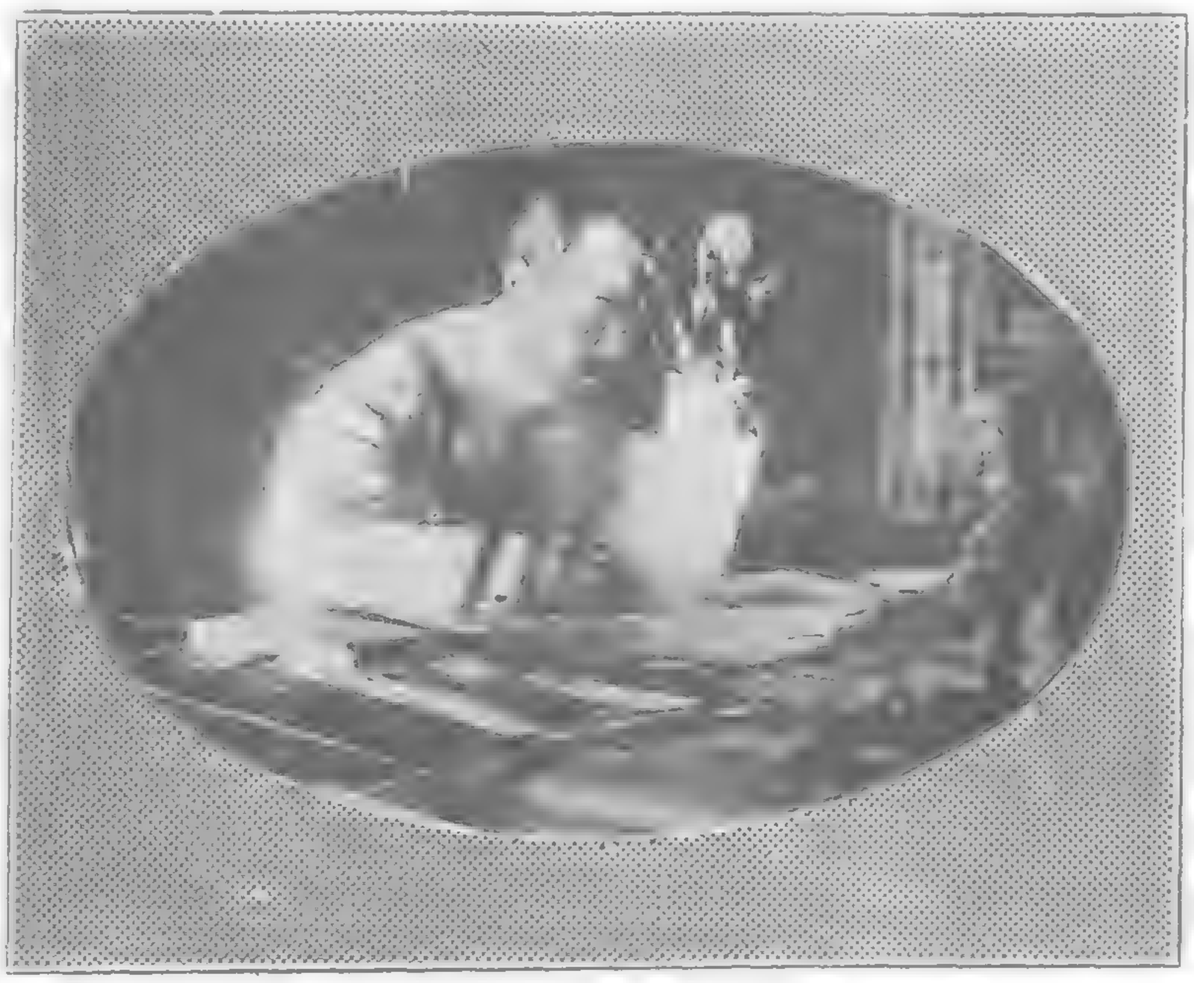
Present Conditions and Future Development

By Georges Hebmann (Chevalier of the Legion of Honor), Manager, Paris Office Guaranty Trust Company of New York, in "The Asiatic Review"

AT a time when the attention of all the civilized nations of the world is called with particular insistence to the possibilities of developing their own resources and those of their colonies, it should be interesting to cast a glance on a country which, as a result of its geographical situation, the aptitude of its population, and its marvellous natural riches, is called upon to play a part of growing importance in the economic life of the Far East. This country is Indo-China. one of the finest parts of France's colonial estate, and which, within the short lapse of time during which it has been under French rule, has given such satisfactory results, that it could be said to have justified all the hopes which have been placed in it.

Organization

History.—At the end of the eighteenth century, France had already obtained a footing on different points of the coast of Indo-China, but the creation of this colonial domain, the history of which would be too long to relate, actually dates back to the year 1862, when France occupied the three provinces of Saïgon, Bien-Hoa and Mytho in Cochinchina, which was definitely acquired in 1867, when the three remaining provinces were taken over. In 1863 a protectorate was established over Cambodia, and in 1873 France occupied Hanoï in Tonkin. There is no need to retrace the well-known events which brought about the signing of the Tien-Tsin Treaty of June, 1885, under which China acknowledged the protectorate of France over Annam and Tonkin. Gradually the pirate bands which disturbed the peace of the country were dispersed, and in 1889 the work of pacification was practically completed. Since that time, except for a few unimportant incidents, the country which nowadays forms the "Union Indo-Chinoise" has enjoyed peace under the liberal rule of France, whose authorities, respectful of the religions and customs of the native population, have striven to gain a whole-hearted co-operation on the part of the latter. That this result may be considered as having been achieved is evidenced by the fact that during the war Indo-China furnished an important contingent of soldiers and artizans who took part in the world's struggle. Moreover, the revolutionary tendencies which became so violently manifest in other European colonies have found little favor amongst the high classes of Annam and Tonkin.



M. Albert Sarrault, Minister of Colonies

Political Organization.—Nowadays the various countries of Indo-China are, from an administrative point of view, grouped together under the name of "Union-Indo-Chinoise." It includes the colonies of "Cochinchina" and of "Laos" and the protectorates of "Cambodia," "Annam," and "Tonkin," to which should be added the territory of Kouang-Tcheou-Wan, leased to France by China for a period of 99 years from 1898.

The Union Indo-Chinoise is administered by a governor-general, assisted by a general secretary and a high council of government. The governor-general is the representative of the French republic, and is invested with numerous and far-reaching attributions. One of his duties is to prepare the budget bill, which, however, must be sanctioned by decree of the French president.

The governor-general delegates part of his powers to lieutenant-governors and residents for the administration of the colonies and protectorates respectively.

A feature of the policy of France has been the maintenance, so far as possible, of the local administration as a foundation on which to establish her rule. In protectorates the rights of the sovereigns and of the functionaries appointed by them are always respected. Furthermore, to ensure a smooth working of the French and native organizations, native assemblies have been created to be consulted on the affairs of the country.



M. Maurice Long, Governor-General of Indo-China

Geography.—Indo-China covres an area of over 775,000 square kilometres—that is, one and a half times France's area, with an S-shaped coast of over 2,500 kilometres. This peninsula is divided lengthwise by a chain of mountains running from north to south, and separating the basins of the rivers Mékong in Cochinchina and Annam and Song-Coi (Fleuverouge) in Tonkin.

These rivers, which at high water are navigable for a large part of their course, serve as a means of access from the sea to the interior of the country and the rich provinces of Yunnan and Kouang-si in China, which now can also be reached by the Yunnanfou railway from Hanoï.

ROADS.—The network of roads in Indo-China is already considerable, and there is in particular a good road which, save for a small portion of about 80 kilometres in central Annam, runs from Lang-Son, on the Chinese frontier in Tonkin, to Battambang in Cambodia, near Siam, so that in a few years, when bridges or ferry-boats are established on the Mékong and Bassac branch, it will be possible to drive in an automobile from China to Siam along the whole coast of the peninsula.

RAILROADS.—As regards railroads, the lines in operation extend over 534 kilometres in Cochinchina and south Annam, 174 in Central Annam. In Tonkin the network is more important. The lines which radiate from Hanoï (pop. 107,000) are the Hanoï-Na-Cham line to the Chinese frontier (167 kilometres), the Hanoï-Vinh-Benthuy line (326 kilometres), running along the coast in a southerly direction, and finally the Haïphong-Hanoï-Laokay line (383 kilometres), built by the colony, but operated by the Compagnie Française des Chemins de Fer de l'Indo-Chine et du Yun-Nan, which built also the extension Laokay-Yunnanfu, penetrating into Chinese territory. This last line, in the construction of which the engineers had to overcome the greatest natural obstacles, is now extremely prosperous, owing to the importance of the traffic of the rich provinces of China.



Saigon Branch of the Banque de l'Indo-Chine, the principal financial institution of the Colony

PORTS.—There are numerous small ports, but there are only two so far of real importance: They are Saïgon (pop. 83,135), in Cochinchina, which, at the mouth of the Mékong, and with its important fluvial port of Cholon (pop. 226,537), is a most convenient outlet for the products of the rice provinces of south Cochinchina, Cambodia, and south Annam; the other is Haï-Phong (pop. 74,917), in Tonkin, which is on the direct route from southern China to the sea. In 1919 over 4,000 ships, representing a tonnage of 2,300,000 metric tons, entered Saïgon harbor, whereas the figures for Haï-Phong were about 3,400 ships, with 667,600 metric tons, in 1918. Tourane is the port of central Annam, and later on may assume greater importance when better means of communication to distant Laos are established over the mountainous regions of Annam.



Saigon: Quai de Belgique corner of rue d'Adran, showing type of Autobus for public service



One of the plants of the Societe Francaise des Destilleries de l'Indo-Chine, the largest distillers of the French Colony

POPULATION.—Indo-China is, as a whole, sufficiently populated, so that its economic development is not likely to be hampered by the lack of labor, as is the case in many new countries. The whole population exceeds 17 million inhabitants, corresponding to an average of 20 per square kilometre. This appears comparatively small; but it should be borne in mind that an enormous area of the country is thickly wooded and mountainous, so that, while the



Saigon Arsenal, equipped with complete Shipbuilding and Repairing Plant. The s.s. "Albert Sarraut" on the ways ready for launching

proportion is only 2 inhabitants per square kilometre in the Laos district, 10 in Cambodia, 27 in Annam, it rises to 53 in Cochinchina, and 59 in Tonkin ; in the delta of the Song-Coi it even exceeds 333.

The white population, which is mostly French, numbers about 20,000, not including the troops, which before the war were about ten thousand strong.

Rivers.—As already indicated, a salient feature of Indo-China is the great number of rivers which irrigate practically all parts of the country ; the largest, the Mékong and the Song-Coi, end in wide deltas, which form the richest provinces of Indo-China. In Cochinchina especially the digging of the canals, which was begun on a large scale by the first military chiefs, and which has been continued since by the successive governors, is one of the finest achievements which France can boast of having accomplished in her colonies ; a consequence of the continuation of this wise police has been the development of the rice production, which has trebled in the course of twenty years.

The conditions of living of the population have been, of course, determined by the geographical characteristics of the country, and this accounts for the fact that Indo-China is primarily a country of intensive rice growing and of marine and fluvial fishing. The local consumption of fresh fish is enormous, and comes immediately after that of rice, which is the staple food of the population.

Natural Resources.

Fishing Industry.—In favorable years Indo-China exports over 30,000 metric tons of dried fish and 2,000 metric tons of fresh fish to neighboring countries, and to Hongkong and Singapore especially. As by-products, about 3,000 tons of fish glue and oil are shipped from the colony yearly. From a commercial point of view, Camboda, with the big Tonle-Sap Lake, is the main productive centre, and it should be mentioned that the renting of the fishing licence is an appreciable source of revenue for the Government.

The fishing industry could beyond and doubt be further developed if the obsolete methods still used by the natives could be gradually replaced by trawling. Though competition may come from Japan, and perhaps from the Philippine islands, so great is the demand from China that this country is likely to remain always a good market for the Indo-Chinese production ; at the same time the fish oil industry could be also intensified, and larger exports would be easily absorbed in France or other European countries.

Cattle.—Before turning to the capital question of rice production, we may say a few words of cattle raising. The most recent census reported in Indo-China 3,000,000 head of cattle (including 1,500,000 buffaloes) and 2,660,000 pigs ; out of this total there are 1,200,000 oxen and buffaloes in Cambodia alone, which, in 1910, was able to export 31,594 oxen and 15,975 buffaloes to the Philippine islands (33,000 oxen and buffaloes in 1911). However, the prospects of a great development for cattle raising are as a rule impaired by violent epizootics, difficulty of feeding during the dry season, and other climatic conditions.

In recent years an attempt was made to create frozen meat and packing industries ; two factories were established, one in south Annam, the other in Cambodia. In conjunction with this trade, it may be indicated that in 1913, 3,139 tons of raw hides were exported from the colony, one-half of which went to France, the other half being shipped to China and Hongkong. Exports of manufactured skins are small (783 tons) owing to the imperfection of the tanneries ; but there is the possibility of a great expansion in this line when more modern installations attract the production of the Siamese Laos and of Yunnan.

Rice.—The chief source of riches for Indo-China is the cultivation of rice, for which the natural lay of the country and climatic



Chinese Rice Mill at Cholon



Arched Reinforced Concrete Bridge at Cholon (Saigon) erected by Brossard et Mopin

conditions are most suitable. The rice fields now under cultivation cover about 4 million hectares (over 1,500,000 in Cochinchina, 900,000 in Tonkin, and 700,000 in Cambodia). In 1920 the area sown with rice was 4,800,000 hectares, but there is still the possibility of recuperating about 1,800,000 hectares. The qualities of the rices grown, when carefully selected and hulled, compare most favorably with the best Burma and Java descriptions, but owing to the fact that until recent years the whole rice manufacturing was in Chinese hands and the methods generally defective, the Indo-Chinese varieties were generally considered as inferior; efforts are made now to have selected seeds giving a better yield both in quantity and quality. Three or four years ago two important rice factories, operating with up-to-date equipment, were established in Cochinchina and Tonkin. The native consumption takes up about 3½ million metric tons of rice yearly; up to 1913 the production averaged about 4½ million tons, so that one million tons was available for exports. As production has developed, the exports have gone up from 250,000 metric tons in 1868 (1,286,804 tons in 1913) to 1,619,715 tons in 1918; for 1919 the exports amounted to 966,835 tons only. This big decline was due to the rise of the Indo-Chinese piaster, which exceeded that of the Indian rupee, so that rice importers were induced to make their purchases in Burma. These figures show Indo-China to rank immediately after Burma for rice exports; most of these go to China, Japan, and the Philippine islands through Hongkong. Though competition may become keener, the situation of Indo-China in the middle of a population of over 500 million of rice-eaters is a guarantee of a sure outlet for her surplus. Besides, in the last twenty years export to Europe has been steadily increasing, and France under normal conditions is likely to become an important customer for her colony.

OTHER CEREALS.—Another cereal prospers in Indo-China; this is maize, which until recent years was hardly known outside Tonkin; now its cultivation spreads over all the regions of the Union Indo-Chinoise, and it seems to be well adapted for Cambodia especially. Exports, which amounted to only 107 tons in 1904, reached a maximum in 1913 with 133,000 tons, and have averaged 54,000 tons since.

Other produce are manoic, arrowroot, sweet potatoes, beans and peas, the production of all of which might easily be developed in Cochinchina and Tonkin, to leave a surplus available for exportation to Europe; thiere are also numerous fruits—mangoes, mangosteens, ananas, and letchis—but they are mostly consumed in the country, and some years would elapse before export could really become important. A first condition would be to have steamers adapted for the carriage of tropical fruits.

COFFEE.—Coffee can also be cultivated with success. Advantages have been granted to planters in the way of a premium paid on exports to counterbalance the abnormal value of the local currency. The exports barely attained 234 metric tons in 1909; they were more than doubled in 1919 (534 metric tons).

TEA.—Indo-Chinese tea, though inferior in quality to China tea, is generally admitted to be quite as good as the Ceylon brands, and with some efforts to improve the cultivation and preparation methods, it could be made to compete successfully with English and Chinese teas on the French market, which could easily take all the production. Algeria, Tunisia, and Morocco, with an annual consumption of 3,000 metric tons, would become also excellent customers.

SUGAR.—Sugar-cane growing succeeds in all regions, but great improvements are needed to obtain anything like the 10 tons yield per hectare obtained in Java, the present yield being scarcely 2 to 2½ tons; however, in view of the enormous Chinese market at the very door of the French colony, it seems that it would be well worth trying to increase the production, which averages only 3,000 tons yearly.

PEPPER.—Indo-China is a large producer of pepper (4,000 tons yearly during the war); in a certain year the exportation exceeded 6,300 tons, one half of which went to France, and satisfied the whole metropolitan consumption. Nutmeg is also an important product, though the Indo-Chinese variety meets with comparatively little appreciation in European markets (837 metric tons in 1919).

COTTON.—Among the textile plants which grow in the colony, particular attention should be given to cotton. The production is about 9,000 metric tons yearly, 6,000 tons coming from Cambodia, and the rest from south Annam. There are two kinds of cotton: one, cultivated along the banks of the Mékong, which are flooded each year, gives a short staple (18 to 22 millimetres) product, which is utilized on special looms; the other kind, grown on the high ground called "terres rouges," of incomparable fertility, is a most excellent product, with a long staple (28 to 29 millimetres), comparing favorably with the American "good middling." Since the war a large portion of land has been cleared for cultivation, and up-to-date ginning mills have been installed with American machinery at Kompong-Cham in Cambodia; they can produce 80 bales of 110 kilos per 12-hour day. There is another important ginning factory at Khsah-Kandal, dating back to 1891, which is in Chinese hands; it treats about 6,000 metric tons of raw cotton yearly, producing 300 tons of oil and 1,600 tons of oil-cakes. The total area available for cotton-growing in Cambodia may be estimated at about two million hectares; but one of the difficulties to be overcome is the lack of labor, for which the only remedy would seem to be immigration of Chinese artisans.

SILK.—Silk is another item of particular present interest in view of the keen competition of American and Japanese purchasers on the Chinese market, which render the supplying of European manufacturers daily more difficult. The silk industry was, needless to say, a fundamental one in Indo-China; but the methods applied by the native silk producers gave comparatively poor results. Owing to constant efforts, a material improvement has been achieved not only in quantity (1 kilo of raw silk for 18 kilos of cocoons against 26 kilos formerly), but also in the quality, which can now be assimilated to the Canton first grade; Tonkin pongees are also appreciated. Up to now, the major part of the production was utilized locally, the maximum quantity exported being 101 tons in 1911; but it is considered in colonial circles that the production, through private as well as official enterprise, could be tremendously increased, for the conditions are extremely favorable. There can be no fewer than five silkworm crops yearly. At present the area cultivated in Chinese mulberries is 8,000 hectares, with an output of nearly 4,000,000 kilos of fresh cocoons and 150,000 kilos in raw silk for Cochinchina and Cambodia alone; a methodical program is now contemplated through the medium of a company founded by Lyonese producers to bring the production to 900,000 kilos of raw silk within ten years.

TEXTILE PLANTS.—Other textile plants in Indo-China are jute, ramie, hemp, and kapok; plantations of the tree from which this raw fibre is obtained could be developed to some advantage in Cambodia especially. As much may be said of the coconut tree, the present production of coir used for the manufacturing of cordage being entirely absorbed in the country.

Rushes, which are extremely abundant in the seaboard districts of Tonkin and Cochinchina and other marshy districts of the peninsula, are utilized locally for the manufacture of mats; these articles are exported to Hongkong, from where an important portion is re-exported to Europe under a Chinese label. In the thickly-populated delta of Tonkin there is a local small industry which uses a number of other plants—rotins, latania, rice straw, etc.—for the manufacture of mats, baskets, furniture, etc.

BAMBOO.—A most interesting use of the bamboo-tree is the manufacture of paper pulp. A factory was established in 1912 at Vietry, and its yearly output amounts to about 3,000 metric tons of excellent wood pulp, part of which is utilized in a paper factory at Dap-Cau. This is only a beginning, and there are large possibilities for expansion, as the bamboo-trees are found in enormous quantities along the banks of the Tokinese and Cochinchinese rivers and many other regions of the country.

Until now, the soda and chloride of lime necessary for paper manufacturing have been imported from Japan; but a chemical

factory has recently been erected at Haï-Phong for the treatment of salt by electrolysis, and will be able to supply the chemicals necessary at a much lower price.

Other plants providing good material for the paper industry are rice and "tranh," an indigenous herb growing rapidly in all parts of the colony.

Experiments are being made also with the idea of utilizing the pine trees which cover large areas in the wooded regions of the interior.

Essential Oils.—Among vegetable resources should be mentioned such oleaginous plants as coconut-trees, sesame, ground nuts, ricinus, and soja. In 1914 the exports of copra reached 8,100 metric tons; those of castor-oil were 899 metric tons; soja cakes are excellent as cattle food, and find a good market in England.

Numerous plants are available for the manufacture of essential oils and perfumes, such as citronella, lemon grass, ylang-ylang, cajeput, camphrea, cutch, coca, indigo, etc. These resources have already been exploited, but not nearly to the extent which the possibilities warrant; however, it should be mentioned that badian, the essential oil derived from the fruit of the Chinese anise-tree, shows up well among the exports from Tonkin; these exports averaged 93,000 kilos annually for the period 1909-1913, with a maximum of 240,000 kilos in 1913; the chief market was Hamburg.

Tobacco.—Tobacco has been grown in Indo-China for a long time for local consumption; the native varieties are, however, unsuitable for European taste, and attempts have been made with good results to obtain better qualities. In 1920 certain quantities were imported into France for the government.

Rubber.—Last, but not least, in view of the possibilities of development which it offers, should be mentioned the cultivation of indiarubber trees. Some twenty years ago, Indo-China exported a small quantity of indiarubber produced by the trees growing in the forests of the interior; but the acclimatization of the Hevea has been attempted since with great success, and now practically all the products exported come from Hevea plantations. The development of this industry is shown by the progression of exports which from 175 metric tons of indiarubber (wild and cultivated) in 1910 went up to 531 in 1918, and 2,976 in 1919 of cultivated Hevea alone. The abrupt drop in the price of the "hard Para" and "Plantation Crepe" on the London market put a temporary check on the production, but it is expected that the Indo-Chinese output may be brought up to about 8,000 tons yearly some years hence, when circumstances warrant.

Mines and Industries

Coal.—From the point of view of mineral resources, the fact of capital importance is the presence of coal in Tonkin. There are deposits in central Annam and Laos; but, for the time being, the Tonkin coal mines alone retain our interest. The most important are those of Hongai (operated by the Société Française des Charbonnages du Tonkin), covering 22,000 hectares in the Bay of Along, at 25 kilometres from Haïphong, with three centres of exploitation at Hongai, Hatou, and Campha. The reserves are estimated to be 12 billion tons; but there remains a long stretch of territory to be prospected. The Hongai coal is anthracitous and, as such, ill-suited for shipping requirements. Imports of soft coal from Japan are necessary; but it is hoped that they will be reduced in the future, as soft coal mines have recently been discovered in Tonkin. Other coal-mining concerns are the "Charbonnages de Kebao," the "Charbonnages de Dong-Trieu," and the "Anthracites du Tonkin," but the Hongai mines are by far the largest producers. Their output increased from 257,000 metric tons in 1908 to 576,000 tons in 1916 (544,000 metric tons in 1917). It could be easily brought up to 900,000 metric tons and later on to 1,200,000 tons, if the demand justified this development. The output of the other mines is only 150,000 tons. In 1917 the total output of the colony was 653,910 tons, out of which 313,680 tons were exported, the chief customers being Hongkong, the Philippine islands, and even Japan.

The importance of coal for the prosperity of the colony is emphasized by the presence of important metal mines in the vicinity of the coal, thus opening fair prospects for the creation of a metallurgical industry. Iron is found in four principal districts: (1) That of the Red River (magnetite and hematite); (2) that of the Song-Cau (hematite); (3) that of the Song-Bang-Giang (magnetite); (4) the Dong-Trieu mines near Hongai. Some other mines have also been located in Laos, Cambodia, and Annam, but owing to the climatic conditions, lack of labour, and of coal, they are less interesting for immediate operation.

Whilst iron represents future prospects, zinc is already a paying industry. There are rich mines of blende and calamine in the province of Bac Kan in Tonkin: their holding in pure metal exceeds 60 per cent.; the annual output varies between 30,000 and 40,000 tons yearly, most of which is exported to Europe (production, 48,825 tons in 1916, and 42,552 tons in 1917; exports, 38,190 tons and 19,950 tons in the same years respectively).

Other mineral products are tin and tungsten (at Pia Ouac, production 600 tons in 1918), antimony and gold (Bong Mieu—120 kilos gold); manganese ore (pyrolusite) is abundant in Tonkin. Graphite is found also at Quang-Ngai, whence 7,200 tons were exported in 1919.

Industries.—This survey of the natural resources of Indo-China shows the wide possibilities of expansion which are opening up for industry there. At present, rice factories and distilleries take the first place. The former are found practically everywhere; they are generally small and operated by obsolete methods. The most important (ten in number in 1913) are those equipped with modern machinery; they are owned by Chinese interests, and are established in the vicinity of Cholon, near Saïgon. In recent years two French companies have been created, the "Société des Rizeries d'Extreme Orient" (capital 25,000,000 frs.) and the "Rizeries Indo-Chinoises." The rice alcohol which is consumed by the native population is manufactured for its greater part by the "Société Française des Distilleries de l'Indo-Chine"; the manufacture is under the control of the government. There are besides a few small distilleries, the number of which is legally limited. Numerous mining concerns are already established in Indo-China, but the metallurgical industry is still in its infancy. It should be mentioned, however, that owing to the fact that the engineering industry is already well represented by the Saïgon arsenal, the repair workshops of the Messageries Fluviales, the workshops of the colony railroads and other private concerns, there exists already an important nucleus of skilled workmen.

The timber industry counts a considerable number of native works. There are also a few saw mills, wood distilleries, and two match factories.

According to official figures, the number of industrial, commercial, and agricultural companies is 74, representing a capital invested of about 256 million francs; there are, besides, 22 important private firms.

This brief review shows that much remains to be done before anything like a rational exploitation of Indo-Chinese resources is really begun; but the fact stands out that the following products, among many others, offer great business possibilities: rice, cotton, silk, bamboo, fisheries, coal, and metallurgy. The country is sufficiently populated to supply the labor which, as a rule, is found pliable and adaptable to most kinds of occupation. In any case, China is near at hand, and could supply any amount of excellent labor.

The remarkable possibilities which are thus opening in Indo-China have not escaped the attention of the French colonial authorities. But whereas, prior to the war, there was less necessity to push on the development of the colony, the new circumstances born of the war are making it imperative that France shall devote more attention to her Far Eastern possession, which could procure her a a large portion of the raw materials (rice, cotton, silk) for which she is now dependent upon foreign markets.



Rue Paul Bert, Hanoi



Residency at Hue, Annam

Expansion—Finances, Commerce

A wide program has been recently established by the French colonial minister to equip the colony more fully for its part in the world's commercial future. This program involves the construction of 2,322 kilometres of railroad lines, and in the first place the completion of the Trans-Indo-Chinese railroad (Vinh-Dongha section 300 kilometres, and Tourane Saïgon section 530 kilometres), then the Cambodia railroad from Saïgon to Batambang, and the connecting of the Tonkin lines with the Chinese railroads; the improvement of the ports of Saïgon, Haïphong, Tourane, and Kouang-Tcheou-Wan; the extension and improvement of the networks of canals in Cochinchina; draining and irrigation works in Tonkin and Cambodia (in the latter region 7,000,000 hectares of land are barren; 3,000,000 hectares are of exceedingly rich soil suitable for rice or cotton growing); the building of dams for protection against the Song-Coi floods in Tonkin; the extension and improvement of the roads, etc.

The funds for this program will have to be provided by means of loans. But the prosperity of the colony is such that the increment of charges to be incurred on that account is likely to be easily borne. It suffices to indicate in this respect that, according to official figures, the total funded debt of Indo-China in 1920 amounted to 388,643,798 frs., involving the payment of annuities of 18,558,760 frs. As the aggregate expenses of the budget represented 98,830,741 dollars, the annuities necessary for the service of the loans corresponded to only 6.26 per cent. of the total expenses, computing the piastre at the rate of 3 frs.; but as the currency stands at a premium, the present loan charges are considerably below this percentage.

This appreciation of the local currency is not without its drawbacks, as, from the point of view of French expansion, it prevents the inflow of French capital which is so necessary to regenerate the dormant forces of this huge country.

The question of the currency has been of paramount importance since the war. In 1914 the value of the piastre, which contains 24.03 grams of fine silver, was about 2.50 frs.; but the appreciation of the value of the silver metal and the decline of the franc were two factors which in conjunction with a favorable trade balance caused a tremendous rise of the piastre; the latter attained 16.50 frs. (maximum) in February, 1920; subsequently there were violent fluctuations, which in consequence of the difficulties they caused in the economic life of the country necessitated an action on the part of the government; the latter, rejecting all radical solutions, such as the creation of a gold standard, a reduction of the fine silver contained in the coins or the introduction of the franc as monetary unit, determined that the piastre notes of the Banque de l'Indo-Chine should compulsorily be accepted as legal tender (cours forcé), and that the exchange rate with the franc would be fixed from time to time by decree.

A few statistical data will serve to show the development of the foreign trade of the "Union Indo-Chinoise" in recent years:

(In million francs.)

Years.	Imports.	Exports.	Total.
1913	305	345	650
1919	751	1,051	1,802
1920	1,097	1,181	2,278

Cochinchina accounts for 72.2 per cent. of the total commerce; Tonkin for 24.1 per cent.; Annam for 2.5 per cent.; Cambodia for 1 per cent. All the trade of Bambodia and south Annam passes through Cochinchina.



Royal Palace at Pnom Penh, Cambodia



Museum at Hanoi



LIBRARY BUILDING FOR NATIONAL SOUTHEASTERN UNIVERSITY, NANKING

THE library building for the National Southeastern University, Nanking, designed by and erected under the supervision of Lam, Glines & Co., Inc., architects and engineers, Shanghai, is noteworthy not only because of the merit in the design of the building itself but also for the fact that it is the first building of its kind ever donated to the public by an individual in this country.

When the National Southeastern University found its library facilities inadequate to accommodate the hundreds of ardent scholars who pour in in increasing numbers every year, there rose in response to the need a man with a noble heart and a generous purse. A donation of a considerable sum was offered to the University for the erection of a modern library. The name of the giver is no less great than the donation itself, for he is no other than General Chi, tuchun of Kiangsu. To perpetuate the noble deed, the University has named the library after the governor's father.

As an architectural problem, this library is successfully solved. It is a structure of two stories and a basement. In plan, generally speaking, all public spaces and offices occupy the central portion of the building with the stack room extending into the rear, as by virtue of their functions they should. The reading rooms occupy the two wings and all the mechanical and sanitary equipments go in the basement. This distribution renders the different services of the whole library in perfect harmony and ease.

The architectural design of the building also bespeaks of careful study and selected taste. The order used here is Roman Ionic. The main facade is over 124 feet long and 44 feet high. It is honestly treated in three bays as suggested in plan. The central bay has a portico of four Ionic columns, 28 feet high, crowned by a pediment of singular dignity and simplicity. The freize over this portico bears the inscription "Meng Fong Library" in Chinese, "Meng Fong" being the name of General Chi's father. Under this portico is the main entrance reached by a flight of imposing granite steps. The entrance details of richly panelled oak doors with iron-grilled transom above, framed in a granite architrave with freize and cornice overhead, are decidedly refined in design.

This portico motif is recalled on the side elevations by end-pavilions, having the same number of columns, while on the rest of the wall surface pilasters are used. This treatment at once gives the building accents of interest while at the same time it imparts to it that grace and dignity which a building of this nature must possess.

The interior is also finished in classical treatments, and equipped with the latest in heating, lighting and sanitary installations. The steel book stacks used are specially ordered from America.

The building will cost approximately $160,000.00 and will be ready for use in the Spring of 1923.

The Bank of The Far Eastern Republic

The bank, a semi-governmental institution, was opened with headquarters at Chita on April 25, 1922. The board of directors consists of five members, three representing the government of the Far Eastern republic, one representing the Chita chamber of commerce, and one the centrosoyus, or union of co-operative societies. The bank has an authorized capital of 2,000,000 gold rubles, of which the government proposes to hold 55 per cent. and the remainder is open to subscription by private individuals and firms. Foreigners may buy shares under certain conditions.

Branches have been established in Verhkne-Udinsk, Stretensk, Blagovyeshchensk, Troitz Kossavsk, Bargusin, and Harbin. The Harbin branch of the International Banking Corporation is at present the principal foreign correspondent.

The balance sheet, as of August 1, including the business of the branches, without elimination of duplications, shows total assets of 4,600,654 rubles, excluding 877,950 rubles of shares unsubscribed, but including 659,160 rubles of stock subscriptions not yet paid up.

Powdered Coal: Its Application and Advantages

By W. D. Thom, Chemical Engineer

IN recent years there has been developed a new method of burning coal for heat energy; that is the burning of the coal after it has been ground to powder. Two systems are used in pulverizing coal so that it may be conveyed easily by means of a screw conveyor, by compressed air, or suspended in a stream of low pressure air.* These systems are: (1) The unit system or unit milling plant, in which one machine prepares and delivers the pulverized coal to the furnace; and (2) The multiple system or central milling plant, in which the coal is prepared in a separate building and transported therefrom to the furnaces. The unit system is located adjacent to the furnaces; Fig. 1 is an illustration of this system.

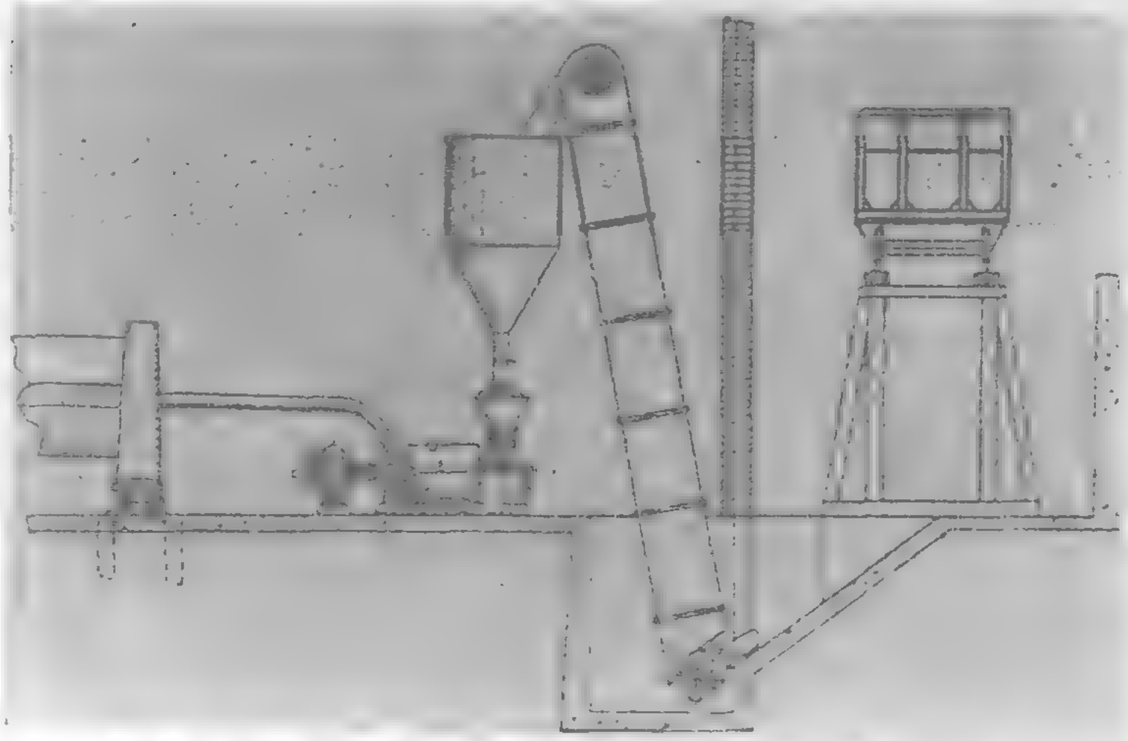


Fig. 1. The Unit System and Aero Pulverizer Supplying Pulverized Coal to Rotary Kiln

It is smaller than the multiple and is very similar in design in different industries. The multiple system is large and is used more extensively than the unit system. It consists of many different pieces of machinery and apparatus, which differ considerably in design in different industries. A diagrammatic illustration of the multiple

* "The Preparation, Transportation, and Combustion of Powdered Coal" by John Blizard, Bul. 564, Canada, Department of Mines.

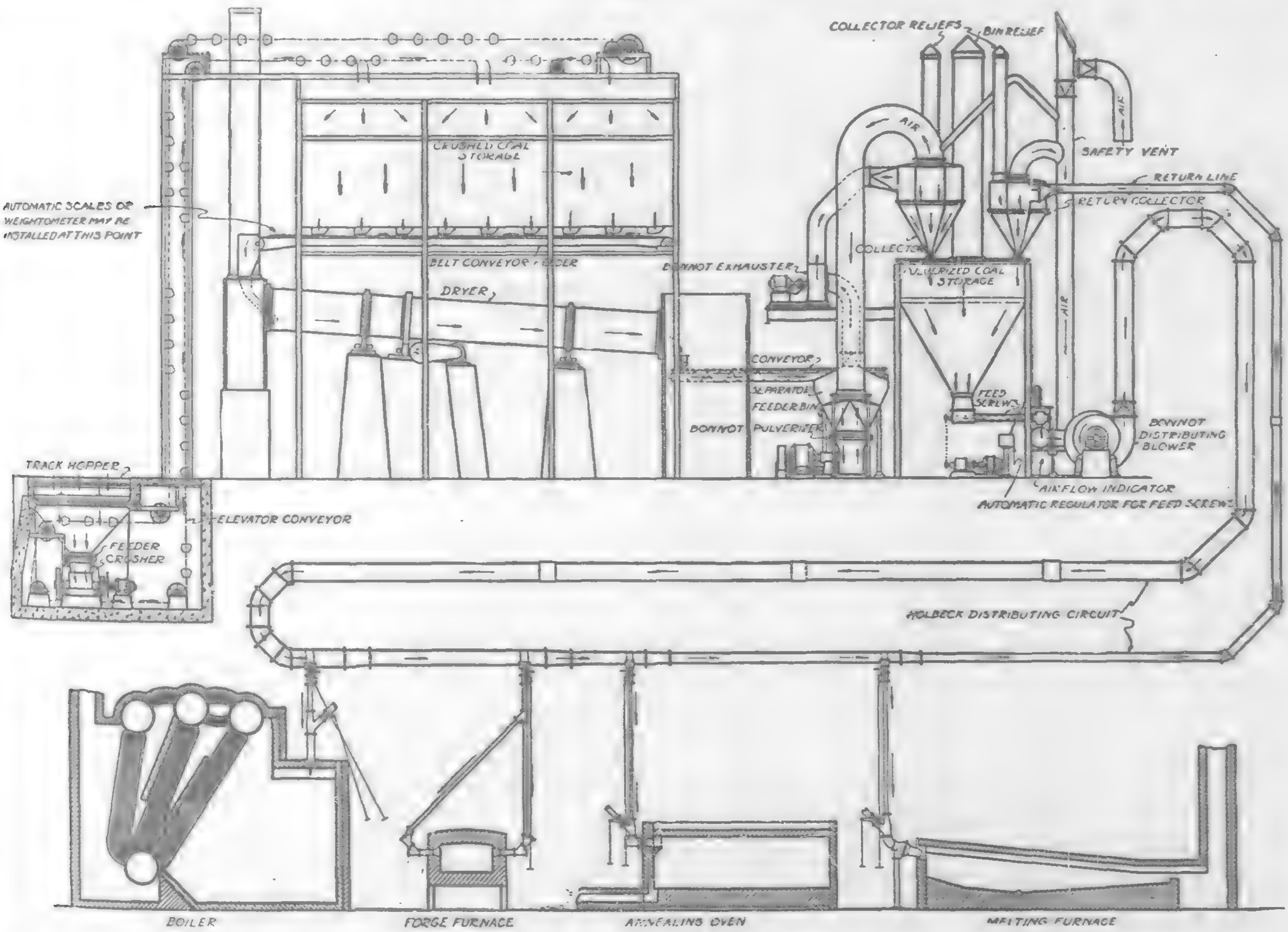


Fig. 2. Diagram of Typical Holbeck System

system is shown in Fig. 2, and the plant as it appeared under construction is shown in Fig. 3.

Both systems have been so well perfected in the United States and Canada that to-day the advantages and economies of pulverized-coal and its uses are extended into practically every industry. It is the purpose of this article to describe briefly the industrial applications of powdered coal and its advantages.

The pioneers in the application of powdered coal were the cement manufacturers, in whose plants the rotary kilns are largely used. In fact, the rotary kilns, where labor cost is greatly reduced, have been made universally possible by the use of powdered coal. The fact that the cement engineers were familiar with crushing and pulverizing problems and appreciate the value of grinding unpalpable powder, is responsible for the success in the presence of discouraging failures in other fields. Pulverized coal has been used in connection with the manufacture of cement since 1895, and to-day this industry uses the most fuel in this form. The consumption in the United States alone amounts to over 8,000,000 tons per year.

The advantages of using pulverized coal in the cement industry are found to be as follows: (1) Absolute control of temperature made possible by the flexibility of operation and simplicity of handling; (2) Absence of smoke and the utilization of practically all the heat units in the coal; (3) Production of a highly luminous flame, creating a concentrated, radiant zone, very desirable for clinkering; (4) The ash of the powdered coal is of secondary influence in the quality of the cement produced.

The operation of pulverized coal firing systems in the lime kilns as well as in the clay kilns has given valuable results to the users. At the muscle shoals air nitrate plant lime kilns of one hundred tons capacity per day were successfully operated. Fuel saving and perfect control of temperature are distinct advantages. In the kilns of the clay industry saving of fuel as high as fifty per cent. is possible. In addition to this saving the coal can be transported in pipes much the same as gas or oil; this is a considerable saving of labor, especially when the brick yards are large, and the kilns are far apart. Furthermore, compared with hand-firing, the burning period can be materially reduced, because, during the oxidation period, heat can be applied to the utmost. Oxidizing conditions can be maintained throughout the burning, thus reducing the burning period and improving the quality of the ware.

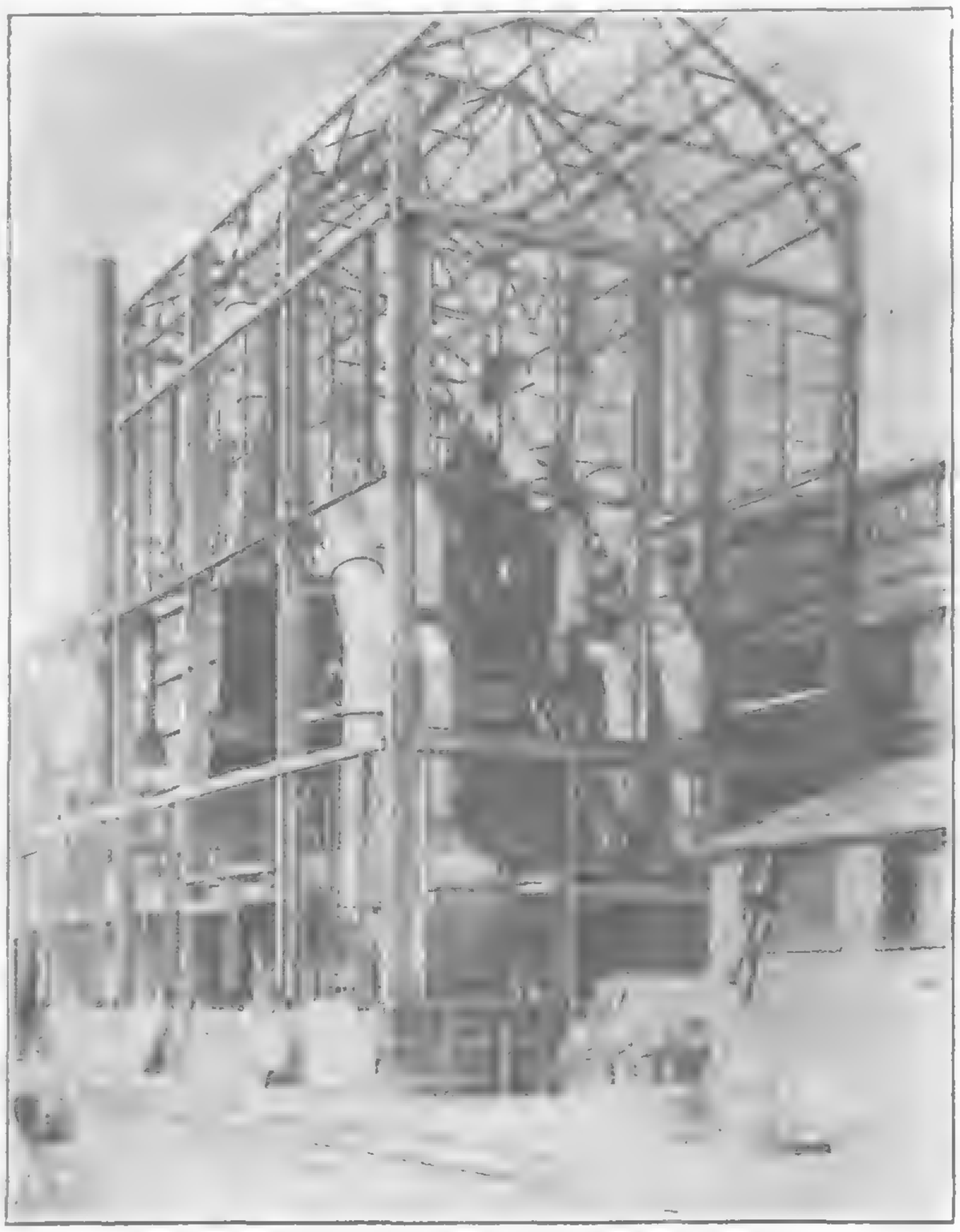


Fig. 3. Powdered Coal Plant of the Holbeck System

The next general application of powdered coal was in the metallurgical industries. In the iron and steel industry the principal applications are for the following classes of furnaces :—

(1) Heating furnaces: (*a*) Heating, re-heating, and forging; (*b*) continuous heating for blooms and billets; (*c*) annealing malleable iron and steel plates and castings; (*d*) sheet and pair; (*e*) tin and galvanizing pots; (*f*) soaking pits, busheling and puddling.

(2) Melting furnaces: (*a*) Open hearth steel; (*b*) malleable iron; (*c*) gray iron melting.

In the heating, re-heating, and forging furnaces powdered coal has been so successfully used that it is now displacing natural and producer gas, as well as hand-firing. The saving of metal loss, particularly at high temperatures, is very marked. The fuel savings have proved highly satisfactory to the users. (From 150 tp 400 pounds of powdered coal per ton of steel have been saved). Increased output, reduced oxidation, and consequently a better quality of product, simplicity and nicety in the control of flame conditions and temperatures, better working conditions for the operatives, are other distinct advantages. The saving of fuel in annealing furnaces runs from twenty-five per cent. up as compared with hand-firing practice. In addition to this there is a large saving in annealing box renewals. Their life is greatly prolonged; this is due to the reduction in oxidation, which occurs because of the low percentage of excess air required for complete combustion. This saving frequently is greater than that secured by the conservation of fuel. In the sheet and pair furnaces the advantages of the powdered coal flame over other methods of firing has been conclusively shown, as the percentage of patched sheets and stickers is greatly reduced. Roll breakage, due to the ductility of the steel after it has been heated by the powdered coal flame, is minimized. Due to the fact that with powdered coal firing no time is lost between turns in cleaning the fires, there is less opportunity for the rolls to chill; this also favorably influences the minimizing of roll breakage. A saving in fuel as high as forty per cent., when compared with hand or stoker coal-fired furnaces, is obtained. In heating tin and galvanizing pots, as well as in busheling and wrought-iron puddling furnaces, increased production and a reduction in fuel consumption of twenty-two to forty per cent. is obtained. In addition, labor saving as high as seventy-five per cent. is possible.

The application of powdered coal in melting furnaces has made enormous progress during recent years. In a number of plants furnaces for the melting and refining of steel by the basic open-hearth process are successfully fired with pulverized coal. It is desirable in this type of furnace, in order that the best results may be attained, that the fuel be pulverized so fine that not less than eighty-five per cent. will pass through a two-hundred mesh sieve, and than the ash contents as well as the sulfur, be low, the former not more than eight per cent.

According to N. C. Harrison,* of the Atlanta Steel Company, Atlanta, Georgia, the advantages and disadvantages in the use of powdered coal, as compared with hot producer gas as a fuel for open-hearth furnaces, from observations of its uses up-to-date, are as follows: "All the heat is generated in the furnace, while in the case of gas producer, from 18 to 25 per cent. of the heat units are lost in the producer itself, when converting coal into gas. The higher flame temperature results in a greater number of heats per

* "Pulverized Coal as a Fuel"— *Mechanical Engineering*, August, 1919.

week. Open-hearth furnaces using powdered coal operated on a very low fuel consumption fully equal to the best producer gas practice, and much better than the average of the older plants in this country; at the Atlanta plant the coal consumption is about one-third less than with producer gas. Coal can be pulverized in plants of about 100 tons daily capacity and delivered to the furnaces for approximately 50 cents per ton, which is about the same as the cost for gasifying coal in gas producers.

"The use of this fuel in metallurgical furnaces has been developed to only 75 per cent. of its ultimate value. In our plant this open-hearth furnace has been shut down oftener than the producer gas furnaces of the same size, due to checkers and slag pockets filling up with cinders and slag after 80 heats. We believe, however, that we are gradually overcoming these troubles by decreasing the size of the uptakes and enlarging the slag pockets as mentioned above. Now only the fine particles are going to the checkers and are being blown off daily by compressed air. By this alteration we expect to get much longer life out of the checkers and consequently longer runs out of the furnaces. As a result of this continued development we believe that inside of six months we will obtain a 25 per cent. increase in production over the gas producer furnaces of the same size.

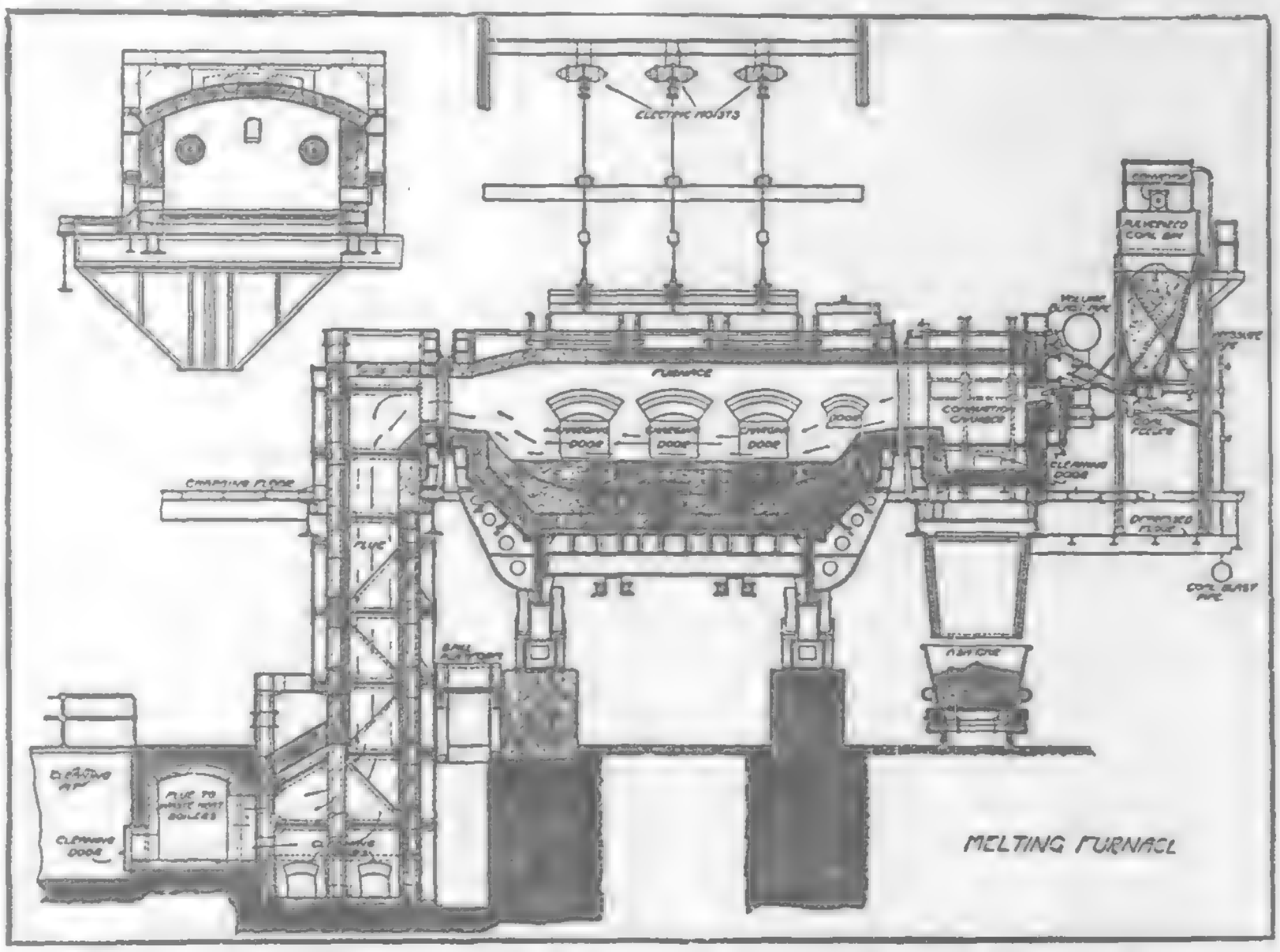


Fig. 4. Open Hearth Furnace Fired with Powdered Coal and Equipped with Waste Heat Boilers

"Sulfur does not give any trouble as long as there is a good draft and the furnace is working hot. We are now using coal with over 1 per cent. of sulfur and getting good results. If checkers get clogged up, and the furnace begins to blow, due to lack of draft, we have trouble with the bath taking up sulfur. The furnace is under complete control of the first helper as to amount of coal being used, as well as air blast and temperature. The flame using the same coal as gas producer is hotter, which allows us to use a greater percentage of scrap per ton of steel, thus reducing the consumption of high-priced pig iron; also it enables us to obtain a greater number of heats per week.

"The finished steel is quieter in the moulds, due to not being over-oxidized, as the coal coming directly in contact with the bath has a greater reducing action. We feel reasonably certain that the oxidation losses are less with pulverized coal than with producer gas. All gas house troubles are eliminated (clearing fires, burning out flues, etc.), although the pulverizing plant must be given attention as to dryness and fineness. Refractory costs have been greater on the furnace using pulverized coal than on gas producer furnaces. I believe, however, than our steadily increasing familiarity with the use of the fuel will enable us to reduce this item nearly to the corresponding cost in producer gas furnaces."

At the basic open-hearth furnaces of the National Malleable Castings Company, Sharon, Pennsylvania, pulverized coal has been used in place of fuel-oil without any sacrifice on tonnage or quality of product in any way and with very gratifying economies. This plant was the pioneer in firing basic open-hearth steel furnaces with pulverized coal, and it has operated successfully and continuously since 1914. Fig. 4 shows an open-hearth steel furnace fired with powdered coal and equipped with waste heat boilers.

The melting of iron by the use of powdered coal in the air furnace for the manufacture of malleable castings was successfully accomplished in 1914. Fig. 5 is an illustration of this. A number of installations have been made in the last few years, which have conclusively demonstrated that there is remarkable economy and convenience in the powdered fuel method as compared with the previous hand-fired method.

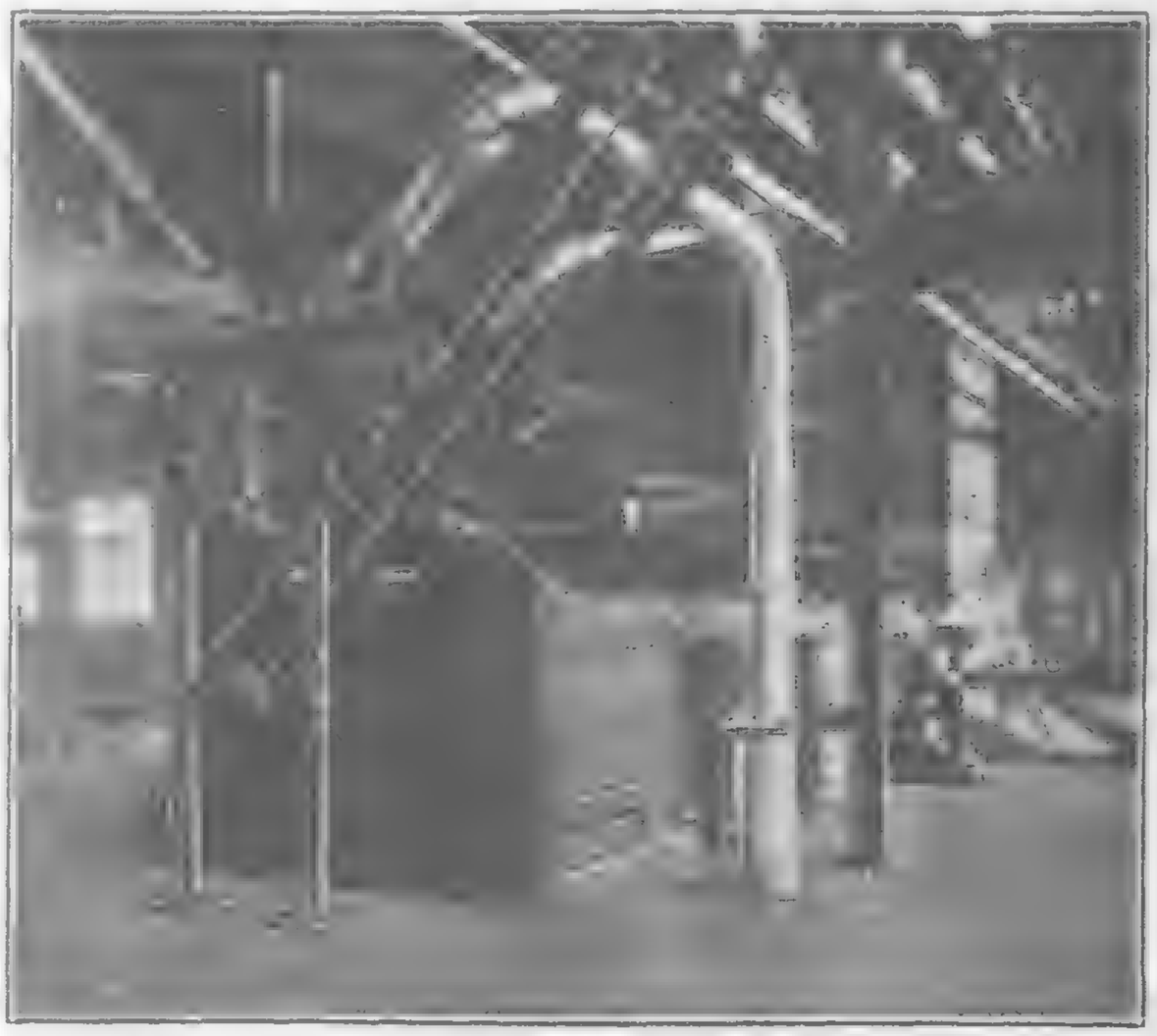


Fig. 5. Furnace for Melting Iron with Powdered Coal (The Holbeck System)

According to F. P. Coffin* of the General Electric Company, Schenectady, New York, the advantages derived in melting iron for malleable castings with powdered coal, as compared with hand-firing, are as follows: "(1) Increased economy. The ratio of coal to iron in hand-firing, under the best conditions, was not over 1 to 2.5, while with pulverized coal the ratio is 1 to 4.5.

"(2) Owing to complete control of melting conditions

* "Pulverized Coal in the Iron and Steel Industry"—*Chem. & Met.* Vol. 25, No. 21, pp. 971-973.

and of the speed of operation the heats may be tapped at exactly the time set in advance. This does not vary more than five minutes from day to day.

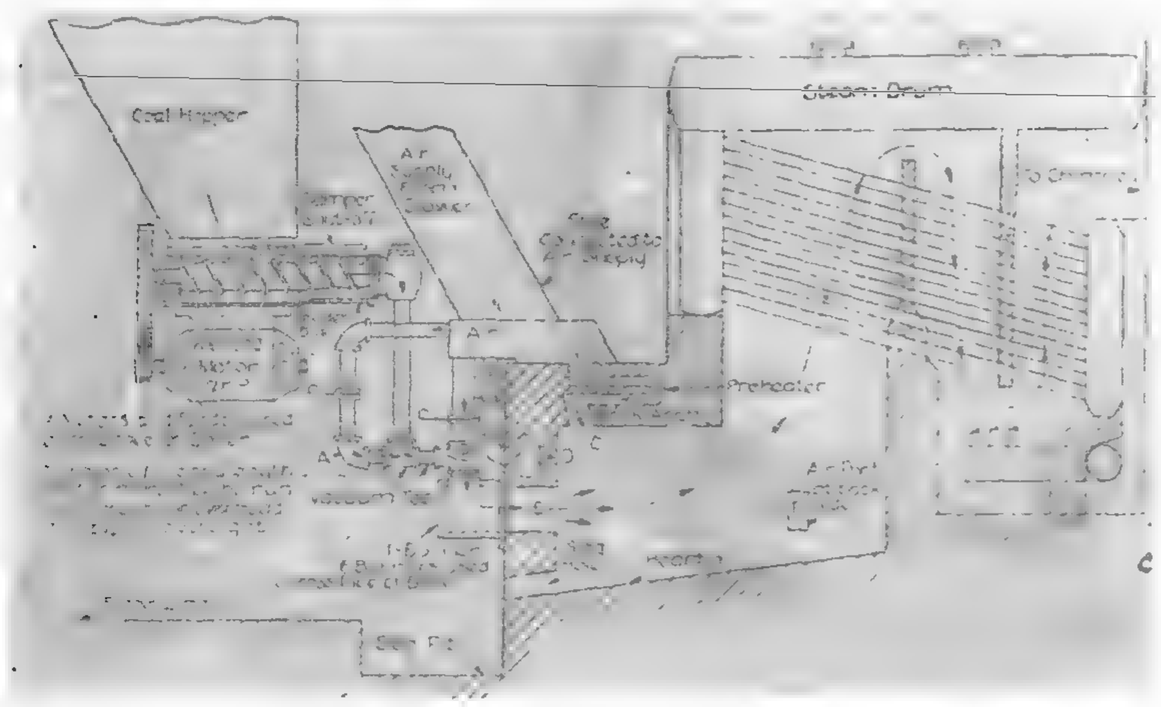


Fig. 6. Sectional View of Boiler

(3) A hotter and more fluid iron is obtained, which is very desirable in malleable iron practice. This cuts down the losses from misrun castings.

(4) Cost of repairs to the furnace has been reduced approximately 5 per cent.

(5) The labor saving in running the furnace is about 1½ m.m.

"A comparison of the operation of the furnace with hand-firing and with powdered coal is as follows :

	Hand-fired Coal	Powdered Coal
Air pressure at furnace—oz.	2.5	0.8
Diameter of main blast pipe—in.	1.8	15.0
Vol. main blast—cu. ft. per min.	3500.0	3500.0
Time of melt—hrs. hot furnace	5.5	3.8
Time of melt—hrs. cold furnace	7.0	5.0
Coal per ton of iron melted—lb.	940.0	600.0

PERCENTAGE OF SAVING

Coal	31%
Pig iron replaced by scrap	18%
Time of melting	30%
Labor	60%
Skimming bars	30%
Cost of repairs	29%

"In comparing the pulverized coal-fired furnace with the hand-fired furnace there are a number of other outstanding advantages which cannot be expressed in figures. These have been summed up as follows: (1) Less slag to dispose of, including all melted ash. (2) Practically no ashes to dispose of. (3) No cleaning of clinkers from the fire-box. (4) No grate bars, no top blast. (5) No smoke at any time. (6) More uniform analysis of castings. (7) Cleaner furnace surroundings. (8) The work is easier on workmen as there is less poking, leveling, and skimming, thus making them more satisfied. (9) Decreased oxidation of the metal."

During the present coal strike in the United States those malleable foundries having pulverizing plants are using a poorer grade of bituminous coal (ash 17 per cent.—sulfur 2 per cent.) because good coal (ash 6 per cent.—sulfur 7 per cent.) is not available. The results obtained are very satisfactory. Only a slight change in the furnace condition is necessary, that is changing the velocity of the draught. Thus it is demonstrated that powdered coal has a distinct advantage in time of emergency.

Success and high efficiency are also attained in the application of powdered coal to the non-ferrous, metallurgical industry. In this industry alone are used from 1,000,000 to 2,000,000 tons of pulverized coal per year. Copper smelting reverberatory furnaces, ore roasting and smelting furnaces, ore melting and reducing furnaces, copper melting furnaces, and brass melting furnaces, are among some of the furnaces in which powdered coal has been successfully applied.

In the reverberatory furnaces for melting copper and other ores, powdered coal has been used very successfully in a number of plants, both in the United States and Canada. In the plants of the International Nickel Company and the Tennessee Copper Company the installation of powdered coal firing in place of hand or grate-firing has shown the following advantages :—

(1) Increased production. Powdered coal firing in one reverberatory furnace smelted 14,272 tons in 1,985 tons of coal per month, while grate-firing in another reverberatory furnace smelted only 7,260 tons with 1,871 tons of coal for the same length of time.

(2) The charging action is continuous; there are no stops for grating ; as the charge in the furnace smelts and runs away, more ore at once comes down from the hopper.

(3) Efficiency is much higher, due to (*a*) Uniform and steady generation of heat; (*b*) complete and rapid combustion at all times; (*c*) combustion taking place where heat is most wanted.

(4) Savings resulted from using cheaper grades of coal ; coal containing as high as 17 to 22 per cent. of ash has been successfully used, whereas in grate firing this is impossible.

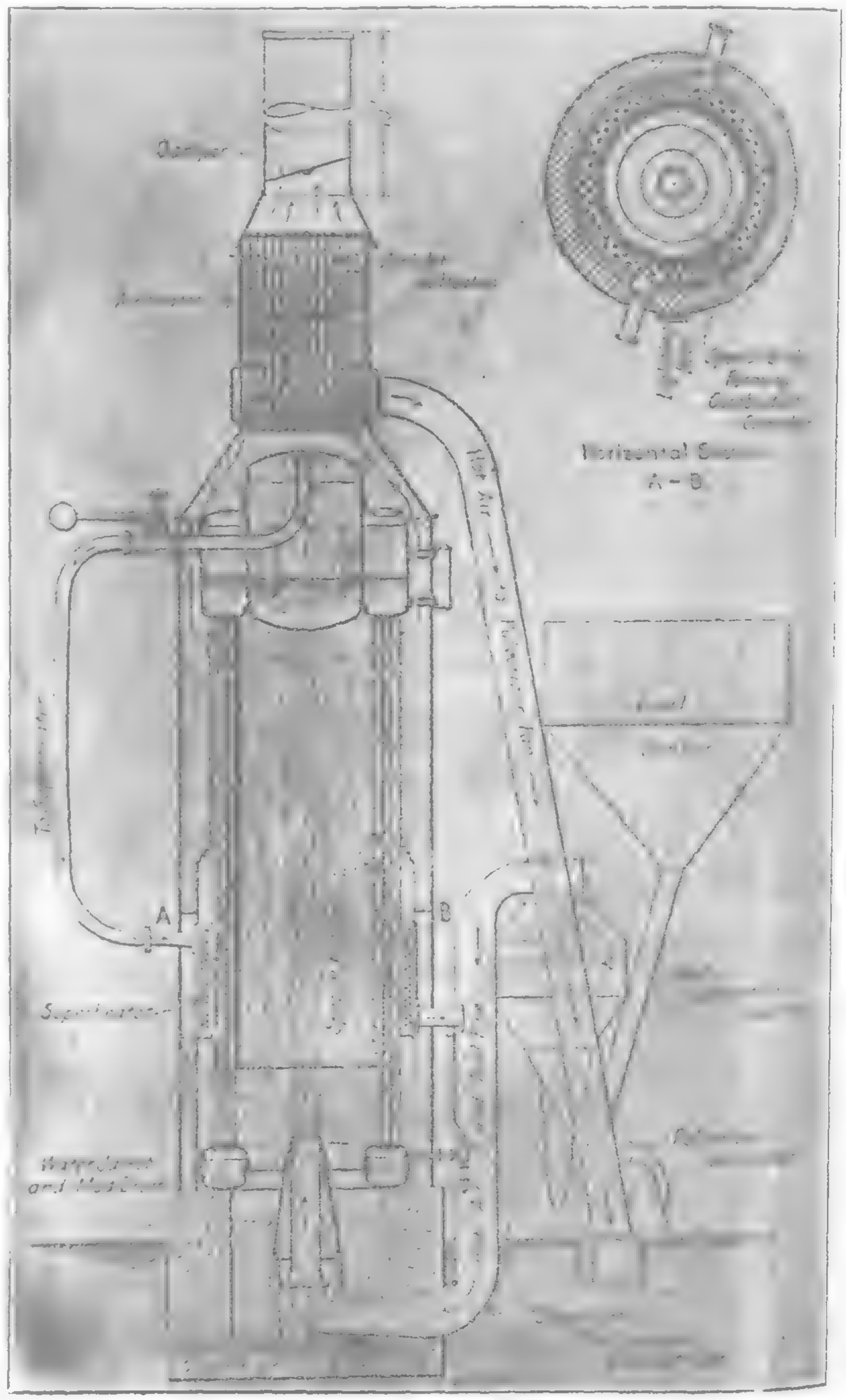


Fig. 7. Bettington Boiler

(5) Flexibility and ease in controlling the flame condition and temperature, which means simplicity and ease in operating the furnace. Furnace firing is controlled by regulating values.

The application of powdered fuel for steam boilers has for many years been uppermost in the minds of engineers and boiler users. They have realized the many advantages and great possibilities in this enormous field. There are records of a number of old, isolated applications of powdered coal to boilers, but it has been only within the past six years that fuel in this form has been accepted by large industrial plants and public utilities for steam generation. The mechanical stoker is now having a keen competition, and it will not be surprising to see the superiority of the new method of firing boilers in the next ten years.

The difficulties first encountered were due largely to incorrect furnace design, not only as regards the general form, but also in regard to the proposition of meeting load conditions, characteristics, and analyses of fuel. The earlier trials were made with bituminous coal, and as the general knowledge of the subject became available, larger projects were undertaken, until at the present time there are a number of plants, such as The General Electric Company, The American Locomotive Company (both at Schenectady, New York), The Milwaukee Electric Railway and Light Company (Wisconsin), and The British Columbia Sugar Refining Company (Vancouver, B.C.), which are of sufficient size and importance, burning pulverized bituminous and anthracite coal and lignite, to furnish a good comparison with similar stations equipped with the stokers.

Fig. 6 shows how the powdered coal equipment was installed at a boiler in the Schenectady works of the General Electric Company.* The boiler was a 500 h.p. Munoz type. A substantial saving was effected in the fuel bill. Efficiency of seventy-five per cent. can be obtained without an economizer.

Fig. 7 is an English type of boiler, designed especially for the use of powdered coal, by Claude Bettington of Johannesburg, South Africa. The flame is projected vertically upward in a brick-lined combustion chamber, surrounded by a circle of vertical tubes. The bricks are cooled by radiation to the tubes. The air is preheated, and a small pulverizer is connected to the tuyere, without intermediate storage for powdered coal. Several of the boilers have been successfully used in South Africa, in Great Britain, and in Canada.

As a result of careful testing and comparison it has been demonstrated that powdered coal for steam generation has the following advantages over the modern stoker boiler plant.†

"(1) Much wider variation in the quality of the coal usable is obtained when coal is burned in pulverized form. All grades of coal are being burned in pulverized form with economy. No stoker will satisfactorily handle all grades of coal. Therefore the use of pulverized coal largely overcomes most troubles due to poor coal, and it is particularly desirable for this reason alone.

(2) The ability to take care of peak loads. In other words, a pulverized coal burning system is much more flexible than a stoker installation. Its flexibility approaches that of fuel oil or natural gas.

(3) By throwing a switch the entire firing operation ceases, an advantage in case of accident or emergency.

(4) Ash is in much better condition to handle. The ash is in the form of dust or slag, depending upon the melting point. This helps to maintain constant furnace temperature, as there are no interruptions in firing conditions on account of cleaning fires.

(5) There are no grates to clinker, particularly after operating at a maximum rating.

(6) Pulverized coal is fired dry, containing less than one per cent. of free moisture, whereas coal burned in stokers may vary in its content of moisture, anywhere from one to ten per cent. of free moisture as fired.

(7) Considerably less excess air is used for complet ecombustion. Less excess air means less power for furnishing air supply, particularly where forced draft is used. With less excess air the stock losses are less. Lower grades of coal fired on stokers require more excess air it is quite difficult for the oxygen to get in close contact with the combustible. An air supply sufficient to furnish all the air for combustion should be available, although at times only fifty per cent. of air need be injected into the furnaces with the coal, the balance being supplied by the induction of action of the burner, or being drawn in by the stack draft. The air going into the furnace should be under control to permit close regulation under all conditions of firing. Less draft is required for pulverized coal furnaces.

(8) All combustibles in the coal are consumed when it is burned in pulverized form, provided the furnace capacity is not exceeded. None of the combustible goes out into the ash pile, and therefore fires in the ash pile are eliminated.

(9) There is less corrosion from sulfur on the boilers, due to less moisture in the coal as fired; therefore high sulfur coals can be burned more rapidly without serious results.

(10) With furnaces properly proportioned and with properly designed burning equipment, smokeless operation has been maintained indefinitely. This is due to the complete combustion of all the particles of coal before they come in contact with the cold surface of the boiler.

(11) Less refractory troubles have developed due to more uniform furnace temperature conditions.

(12) Steam may be gotten up quickly. In a 400 h.p. rust boiler with cold setting, with feed water about 130 F., steam was raised to 150 pounds, and the boiler cut into line in forty-five minutes. The boiler furnace in which this test was made was only figured for normal rating; the rapidity of firing with pulverized coal equals that of any other fuel."

The burning of powdered fuel has been equally successful in boilers of steam locomotives. The early experimental stage is now passed, and several large railway companies have equipped their locomotive boilers with powdered fuel firing. In the United States installations have been made on the Chicago and Northwestern Railway, the New York Central, and the Delaware and Hudson Railroad. In Brazil, South America, the Central Railway of Brazil has equipped its locomotives for burning powdered coal. In all the applications a double advantage is gained, namely, a method of mechanically stoking a locomotive, and a method of utilizing low-grade fuel which can be had at any place. As a mechanical stoker its only competitor is oil firing, and oil is a high-grade fuel which cannot be had very readily in certain parts of the country.

Mr. F. P. Coffin‡ gave as advantages which powdered coal shares with oil, the following:—

(1) Hand labor is eliminated for firing.

(2) The fire is easily regulated.

(3) Less time is required for raising steam from a cold boiler.

(4) There is less back pressure in the cylinders, due to increase ofarea of exhaust nozzle, strong suction not being required to draw air through coal on the grate.

(5) Less time is required for cleaning fires.

(6) There is freedom from smoke, cinders, and incendiary sparks, which cause fires along the right of way.

(7) More fuel can be burned per hour, hence the engine can do more work.

According to C. F. Herington§ powdered fuel has succeeded because of the following advantages:—

"(1) It offers opportunity for even greater accomplishments in the steam railway field than have heretofore been obtained through use in cement kilns and in metallurgical furnaces.

(2) It produces a saving of from fifteen to twenty-five per cent. in coal of equivalent heat value, as compared with hand firing of

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* "The Use of Low-grade Fuels and the Status of Powdered Coal" by F. Parkman Coffin. *General Electric Review*, Vol. 20, No. 8, pp. 606-631.

† "Powdered Coal as a Fuel" by Herington, D. Van Nostrand Co., N.Y, 1920, pp. 256-259.

‡ "The Use of Low-grade Fuels and the Status of Powdered Coal" by F. Parkman Coffin, *General Electric Review*, Vol. 20, No. 8, pp. 606-631.

§ C. F. Herington—"Powdered Coal as a Fuel"—p. 162, D. Van Nostrand Co.

coarse coal on grates. Powdered coal may run as high as ten per cent. in sulfur and thirty-five per cent. in ash, and still produce maximum steam heating capacity; thus otherwise unsuitable and unsalable or refuse grades of coal may be utilized, and hence the saving cost per unit of heat evolved will be a considerable item.

(3) It enables us to maintain fire-box temperatures and sustained boiler capacities equivalent to and exceeding those obtainable from crude or fuel oil.

(4) It maintains the steam locomotive on its present relatively low first cost and expense-for-fixed-charge basis and further reduces the cost of maintenance and operation of large units.

(5) It eliminates the waste products of combustion and fire hazards, and permits the enlargement of exhaust steam passages, thus producing increased efficiency in the cylinders."

With the rapidly decreasing coal supply, the enormous amount of waste, the inconvenience of hand-firing, etc., it can readily be seen that the efficient utilization of fuel supplies is undoubtedly a subject of paramount importance. All the testimony just given shows that America has derived great benefit from employing methods for more efficiently utilizing her fuel resources. The art of burning coal in pulverized form is but another addition to her national security and prosperity. as a result of the satisfactory experiments in America the new art of burning coal has made such a healthy development that it is being recognized, more and more, the world over, as the most promising method of utilizing fuel in the industrial heating operations of the day.

Following the lead of America, England and Canada have spent much time and money in investigating the possibilities of pulverized fuel, and are equipping their industries and municipal lighting and power plants with powdered coal system. Likewise France has installed several large plants for use in metallurgical industries and under boilers, with excellent results. Inspired by the example of larger countries Italy and Belgium, after sending several engineering committees to the United States to investigate the advantages of powdered coal and the success ascribed to it, are convinced of its practicability. Several South American countries, after considerable investigation, are adopting pulverized coal in their industries, chiefly in railroad transportation, and in metallurgical works.

In contrast to the foresight of the countries just mentioned, those of the Far East, China in particular, have done little to provide for the conservation of natural resources. These countries, with their huge populations and their rapid development in industry and commerce, must economically utilize their fuel and other natural resources. Consequently anything that can be done to increase the efficiency of generating heat and power from coal, or economically curtailing the use of fuel-oil (which is costly and is imported annually in large quantities), by the substitution of powdered coal, should be immediately attempted. In view of the purpose of this article, the following table sets forth concisely the advantages of powdered coal:

TABLE

Savings Possible	Other Advantages
(1) Fuel—20-50%	(1) No smoke nuisance.
(2) Labor—25-75%	(2) Flexibility of operation and control.
(3) Oxidation loss—40-75%	(3) More perfect combustion.
(4) Furnace repairs—25-60%	(4) Utilization of low-grade solid fuel.
(5) Disposal of ash—50-75%	(5) More uniform heat.
(6) Grate bars and firing tools—100%	(6) Increased production.
(7) Kindling wood—90%	(7) Cleaner furnace surroundings.
	(8) Automatic handling of coal.
	(9) Boon to the workmen.
	(10) Requirement of less expensive stack.

Chinese-American Co-operation

Buying German Telephone Instruments

IN contrast to the success attained by Japanese-American co-operation in the manufacture of telephone apparatus, is the somewhat doleful story attending co-operation of the same American company with Chinese. Although the Chinese government through the ministry of communications have subscribed to twenty-five per cent. of the shares of the China Electric Company (a combination of the Western and Nippon Electric Companies), it is now reported as specifying German telephones in recent tenders. The situation as reported, shows that the China Electric Company having many accounts overdue have insisted upon cash with all new government orders, and the government, in return for long-term payments, have rejected their own industry and specified to German instruments.

In present tenders for the supply of Chinese government telephones and accessories, delivery is specified not in Shanghai or in any of the ports, but at the actual place of installation, calling for the addition of customs duties, government railway freight charges, and the shipper to be responsible for damage and theft in transit. Under the present conditions in China, it is difficult to get foreign firms to comply with these terms.

Governmental Telephones in China

TELEPHONE systems installed by and operated under the auspices of the ministry of communications in China are as follows:

Harbin (Kirin)	Ashiho (Kirin)
Taonan (Fengtien)	Kweiyang (Kweichow)
Fulungchuan (Kirin)	Changling (Kirin)
Itung (Kirin)	Shasi (Hupeh)
Kirin (Kirin)	Changchun (Kirin)
Shwangchen (Kirin)	Chefoo (Shantung)
Taiyuan (Shansi)	Changchow (Honan)
Kingchow (Hupeh)	Yangchow (Kiangsu)
Soochow (Kiangsu)	Wuhu (Anhwei)
Kiukiang (Kiangsi)	Shanghai (Kiangsu)
Nanking (Kiangsu)	Pukow (Kiangsu)
Chinkiang (Kiangsu)	Tanku (Chihli)
Hankow (Hupeh)	Wuchang (Hupeh)
Hanyang (Hupeh)	Peking (Chihli)
Tientsin (Chihli)	Paoting (Chihli)
Tunghsien (Chihli)	Lungan (Szechuan)

The following are private telephone companies, which have been registered with the ministry of communications:—

Kao-yang Telephone Co.			Kao-yang, Chihli.
Ho-chien	,,	,,	Ho-chien, Chihli.
Kiang-yin	,,	,,	Kiang-yin, Kiangsu.
Ta-chung	,,	,,	Nantungchow, Kiangsu.
Chang-shu	,,	,,	Changsu, Kiangsu.
Quinsan	,,	,,	Quinsan, Kiangsu.
Hsuchow	,,	,,	Hsuchow, Kiangsu.
Kiangsi	,,	,,	Nanchang, Kiangsi.
Hsia-shih	,,	,,	Haining, Chekiang.
Amoy	,,	,,	Amoy, Fukien.
Antung	,,	,,	Antung, Fengtien.

THE FAR EASTERN MOTORS

Bi-Monthly Supplement to the "Far Eastern Review"

Devoted to the Development of Automotive Interests in the Far East

Transportation in China

By Lawrence Impey, C.E. Associate Member Inst. Municipal and County Engineers

Late Chief Engineer, American Red Cross Famine Relief

IT is undoubtedly true that the greatest factor in retarding the growth of Chinese industries and the development of China upon modern lines has been the lack of communications.

Railways have been constructed during the last twenty years which have done much to lessen the problem of transportation, but it is a truism which has been aptly pointed by the recent war, that railways without roads resemble a man without arms.

Even in Western countries the value of roads has only been realized during the last twenty years, their value, that is, as a means of developing the industries of a countryside by filling the gaps in a railway system or systems, and acting as feeders to the great industrial centres through the use of the automobile.

Forty years ago roads were regarded only as a method of transport for carts on short haul, travelers in the locality, etc.; but the advent of the modern road and the high power automobile has changed the whole problem of food supply and passenger traffic.

All materials have to be handled six times under the present system of delivery to railhead, transit, and delivery to destination.

If these same materials can be delivered with only the handling incidental to one loading and unloading the costs will have been lessened 70 per cent., and at the same time if the destination is not over 100 miles a great saving is effected in the time of delivery.

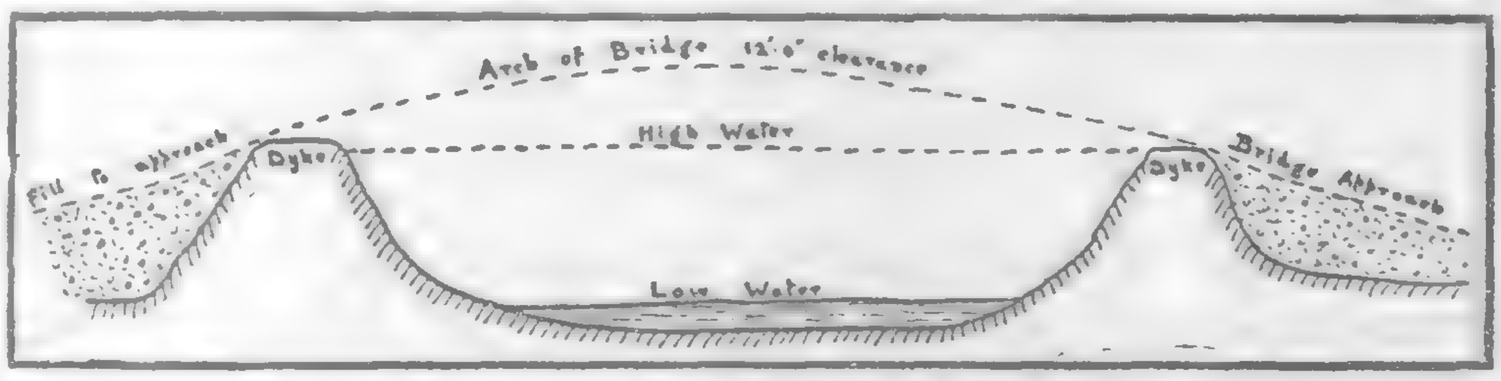
In a country such as China, with its great distances, the best solution of the transport difficulty is to be found in a network of railways which will carry the long distance traffic, with a system of roads and automobile transportation effecting local delivery and collection.

To turn to the consideration of the technical difficulties in the way of an efficient road system, we find that these vary greatly with the terrain of the different provinces through which the road is to be built.

In Shantung, for instance, as was found by the American red cross in 1921, it is impossible to obtain surfacing material close at hand, and the rail facilities for the transportation of stone from the hills will not be available for some years at least, the cost of metalling therefore being prohibitive, so that the expenditure of haulage power will always be high relatively, and the surface repairs necessarily frequent.

Costs in this dirt construction will be much lower however, about $2,000 to $3,000 a mile being sufficient, including culvert work, with the exception of possibly one or two large river transits.

The problem of crossings to some of the canals will undoubtedly be one of the most difficult, as the rise and fall of the water varies in the rainy season from ten to twenty feet, and the surrounding country being below water level the approach to the bridge is rendered very sharp in its gradient (see Diagram 1.)



Canal Bridge

(at least 12'0" clearance for Barges above High Water Mark)

Pontoon Bridge inadvisable owing to Rise and Fall of Water Level

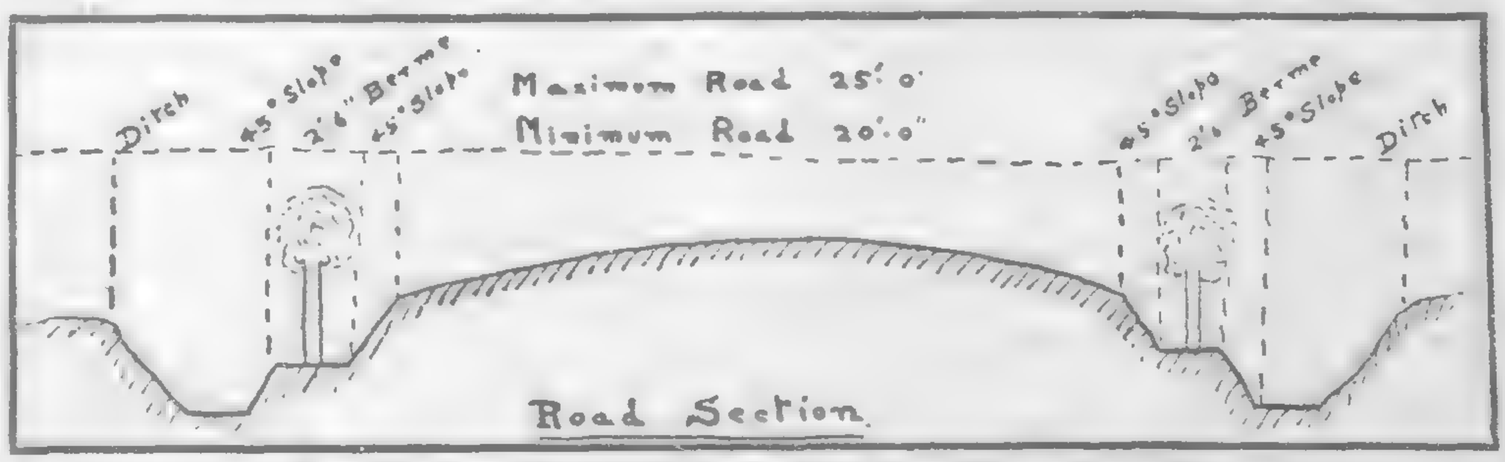
In the mountainous province construction will be more expensive, the red cross costs in Shansi being between $4,000 and $5,000 a mile, including the culverts; but on the other hand the road will be durable, rock surfacing and a good foundation being thus provided by natural conditions.

The advantage of the road for transport in the interior is very marked, as the low gradient necessary for railway construction is very difficult to obtain in mountainous country, and also much more expensive in outlay and upkeep.

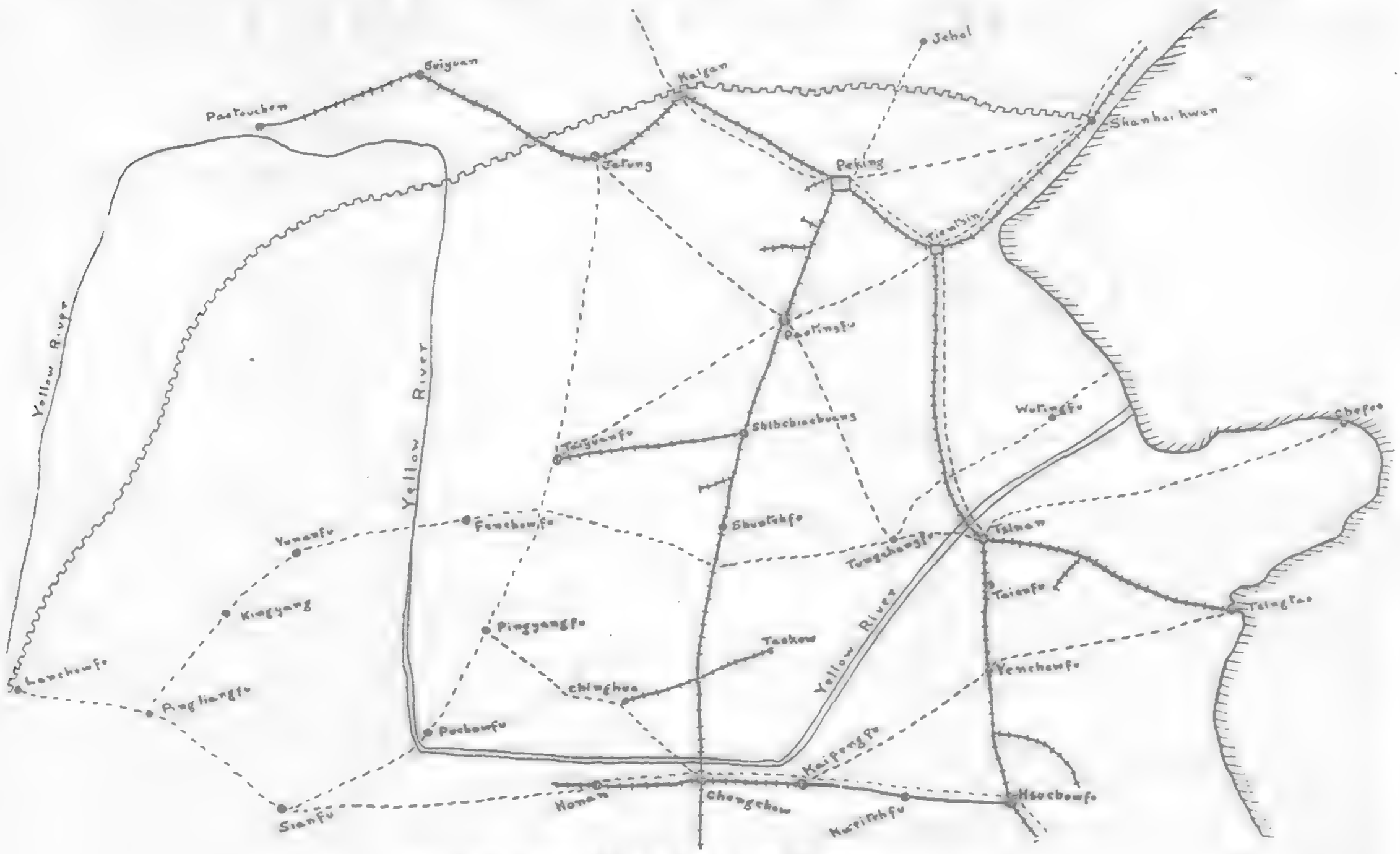
The construction of wells *en route* is comparatively inexpensive, very acceptable to the local population, and a great boon to travelers, while the planting of trees on both sides of the road on the 'berme' will prove of value in retaining the road shape, particularly in sandy country, as the road level should be raised some four or five feet above the surrounding terrain wherever there is any danger of floods. (see Diagram 2)

There is no doubt that the present cart traffic must be kept to side roads as the narrow tyre on the country cart is a most destructive instrument, and moreover the twenty-five-foot road is only sufficient for automobile and pedestrian traffic.

It will probably be found necessary to allow for more than a fifty-foot right of way in those places where an old road is traversed, and there is no alternative right of way for cart traffic to follow, but in the main I have found the construction as indicated



Total Right of Way 50'0" (except for large Embankments)



ROADS AND RAILWAYS OF NORTH CHINA

Railway existing

Roads proposed

in the section appended quite sufficient for engineering needs.

The necessary funds for maintenance work could be obtained by a system of tolls under provincial control, licence taxes on all automobiles, which must be registered, and would be taxed by dead weight or horsepower ; both of these methods of finance being subject to inspection and supervision by the headquarters bureau from time to time.

It is a fact which has been amply proved in other countries that the use of motor transport is very destructive in its effects on roads, and there is thus considerable outlay in upkeep, but on the other hand the initial cost is small compared to that of railway construction, and in China the repair work is chiefly a matter of the right use of manual labor, of which there is an abundance.

A certain number of workmen might be maintained by the provincial or the headquarters authorities, but repair work could be better carried out by the villagers through whose territory the road passes, as it would only necessitate a few days work per annum.

This brings us to the consideration of the question of labor for the initial construction work, and here I hope that a solution of one of China's greatest difficulties can be found, the absorption of her supernumerary coolie soldiers.

All the provincial governors, with the exception of the *tuchun* of Shansi, who has only a small force, well under control, are complaining of the lack of funds to pay the armies within their respective jurisdictions, and I believe that if the soldier once sees come real money within his reach he will be only too willing to work at any task to which he may be assigned.

A large body of men can be thus employed for some years, and the resulting prosperity and industrial activity will be such that at the end of this period the labor employed on this work can be easily absorbed.

One point cannot be over emphasized, and that is the absolute necessity for a satisfactory system of land purchase.

Land is the metaphorical as well as the actual backbone of China, its possession is one of the inalienable rights of the people, and no attempt to benefit the country under the guise of transportation, communications, or any other name, can be successful if it is founded on injustice and official expropriation.

The Chinese famine of 1921 showed that the farming class is far-sighted and open to pursuasion, but no people have a more keen sense of injustice, and it is imperative that, before any work of construction is commenced, an agreement with the inhabitants of the countryside through which the road passes shall be reached.

Land purchase could best be arranged by a valuation committee composed of representatives of the government, the local magistrate, the local gentry, and the farmer concerned ; and the land could be either purchased outright, or the payment spread over a term of years in the form of rent received annually, the land to be the property of the state on the completion of the payments.

With regard to construction costs, some scheme of debentures or bonds would prove possible, and would be taken up by Chinese banks or foreign organizations if the security could be assured, in fact in the South of China some companies are in process of formation for the purpose of building local roads and developing motor traffic thereon.

It might prove possible to arrange for some surplus from the maritime customs surtax to be devoted to this use, subject to proper supervision, or the group of bankers forming the consortium might be induced to take financial interest in this new development of communications in China.

The establishment of a responsible department in Peking who will be prepared to draft plans, make surveys, select the routes, appoint the necessary engineers, and handle the financial arrangements both with the provincial authorities and the bank or banks who hold the bonds, will undoubtedly go far towards establishing the confidence of the outside world in the government who has the foresight and patriotic spirit to initiate this scheme for the welfare of the country.

The Future of the Motor Lorry

Interview with Sir Raymond Dennis, K.B.E.

SIR Raymond Dennis, managing director of Messrs. Dennis Bros., Ltd., the well-known manufacturers of motor-lorries, has just completed a world-wide tour of inquiry into the position of British industry abroad, which occupied twenty months and covered practically all the chief fields for the consumption of British goods. India, Ceylon, Burma, the Federated Malay States, Dutch East Indies, China, Japan, Australia, New Zealand, were in turn visited, and, lastly, the chief South American countries—notably Peru, Chile, the Argentine republic, and Brazil, where more than ever British trade is exposed to severe and successful competition.

At a period in British industrial history of exceptional difficulty the conclusions of a man of Sir Raymond Dennis' grasp and penetration are invaluable, and in an interview with a representative of the *Mining Journal* Sir Raymond was good enough to summarise the views formed during his tour.

The general outlook in regard to British industry, Sir Raymond thinks, is a matter neither for optimism nor pessimism, but for a sane appreciation of economic facts. Everywhere abroad there is a desire to resume and extend trade relation with Britain, the business methods of the Englishman no less than the quality of his goods inspiring confidence everywhere. But owing to the cost of production in this country, and the situation created by the foreign exchanges, prices have been screwed up to a level beyond the purchasing capacity of the foreign consumer, and it is certain that reductions in wages and the price of raw materials are absolutely essential if Britain is to regain control of foreign markets. Foreigners are as anxious as ever to purchase our goods, the high quality of which in the long run making them remunerative even at the higher prices, but the economic position of the civilized world at the present time is exceptional, and the most essential point to consider at present is cost.



Sir Raymond Dennis, K.B.E.

Labor unrest, due to unemployment, is largely the result of the high cost of our manufactures, and the prevailing discontent has resulted in strikes of such frequency as to gain for this country throughout the world an unenviable reputation. These unsettled conditions have made it impossible for British manufacturing firms to fix prices or to guarantee delivery in case their calculations should be upset by troubles in the Labor world. Other countries who are not exposed to the same uncertainties are able to give guarantees, and orders naturally go to them. "Only last week," said Sir Raymond, "I heard of orders placed by the Federated Malay States for railway material to the value of £1,000,000 in the United States, and of £500,000 for electrical material on the Continent, because the goods could not be obtained from Great Britain." The enormous depletion of the wages fund due to this condition of things increases unemployment, which in turn adds to the discontent of the working classes, and so the whole thing moves in a vicious circle. Only a reduction in costs can prevent the invasion of the home market by foreign products, as the natural preference of Englishmen to purchase at home is more than neutralized by the great disparity in prices.

"Realizing the necessity of facing the situation, we have decided to market our standard lorry at £850, or £300 less than the highest price ruling a year ago and only £100 above the pre-war level. Of course, this step involves the necessity of writing down the value of our stock very drastically, but it should also mean a revival in the retail trade and extensive re-employment. If matters are to mend, Labor must act in the same spirit, and realize that in any same scheme wages are dependent upon the work done and not upon time spent. Wages in the engineering trade are still only 6s. per week below the highest pre-war rate, and it is essential that there should be a substantial reduction if we are to bring costs down to a competitive level. Another means of bringing this about is by a longer working week, so as to spread the heavy overhead charges over a bigger output."

The proposal that government should guarantee credits for private trading is attended with obvious danger of abuse; among other things, it would tend to promote risky trade speculation. The widespread credits granted by the German banks to all sorts of concerns before the war brought about a very unhealthy state of affairs. "I do think, however," said Sir Raymond, "that any loans raised in this country for the colonies on account of public improvement should be expended in this country, and an assurance to this effect should be contained in the prospectus, while it should be an absolute condition of government guarantees. In this country a wide field for the absorption of British manufactures is furnished by municipal improvements making for economy of working, and the government should unhesitatingly sanction loans for the adoption of large-scale mechanical devices which will be cheap to work; for instance, the substitution of mechanical traction for horses."

Sir Raymond Dennis' chief object in undertaking his foreign tour was naturally to investigate the outlook of the motor-lorry industry overseas, and he has returned with moderate views as to the capacity of foreign countries, particularly in Asia, to absorb our output in this class of goods, particularly of the heavier type. The whole question is a matter of the character of roadways and bridges, and in Asia especially, where road-metal is not always available and where bridges are of an exceedingly light construction, the native administrations frequently preferring to build them of flimsy material and renew them frequently, the field is only open to the light commercial vehicle. In many of the mining districts, however, where communication with rail-head is indispensable, particular attention is paid to road-making, and the roads will take the heavy lorry quite easily. In certain mining areas, notably in parts of the Federated Malay States, the discharge of considerable quantities of silt in the operations of placer mining creates a different problem. The gradual silting-up of the rivers raises the level of the beds above that of the surrounding country, with the consequence that the rivers overflow their banks after a heavy rainfall and inundate the country. To

meet this, roads in these districts have constantly to be re-traced, and sometimes villages have to be rebuilt at higher levels. In the neighborhood of Kuala Kubu, in the state of Selangor, roads and houses have, for these reasons, been rebuilt three times. During the war, transport conditions were met with similar to those obtaining in undeveloped countries, and the type of vehicle in service in France will do good service overseas, but weight limitations prevent their being employed in many countries, including some of our own possessions. When the weather is moderately dry, the earth roads are quite good for heavy lorry work, but in exceptionally arid districts they are simply a desert full of dust, which after a torrential downpour becomes a sea of mud.

While in the Federated Malay States, Sir Raymond, at the request of Sir Laurance Guillemard, K.C.B., made a general inspection of the road system, and presented an interesting report, which it is hoped will lead to substantial improvement. At present many of the roads consist of laterite, a crumbling rock of volcanic origin, whose wearing qualities are 50 per cent. less than limestone. The states possess, of course, adequate supplies of granite, and the use of this road-metal, together with the substitution of concrete bridges for wooden structures, would permit the use of the heavier and better-class British lorries and give a strong impulse to development. The existing restrictions on gross load weights practically amount to the exclusion of all but the light American truck, even in many of our own possessions.

"Generally speaking," said Sir Raymond Dennis, "the idea that the overseas market can absorb anything that we make is erroneous. Mechanical transport will grow, but it will grow steadily, not hurriedly, and side by side with road development."

Tire Flaps

THERE is probably no part of a pneumatic tire as little understood or appreciated as the flap and yet its importance can hardly be overestimated.

The use of a correctly designed flap, properly applied in the casing, will insure full and satisfactory service from the tube, while an incorrectly designed flap or improper application of the correct flap is certain to result in damage to tubes, casings and dispositions.

The function of a flap is to protect the inner tube from injury the bead toes and by the rim. This it does by forming a continuation of the smooth inner surface of the casing against which the inner tube inflates from a point above the bead, down across the rim and up to a corresponding height on the opposite bead.

The technical service department of the United States Tire Company in an authoritative statement places herewith at the disposal of tire users simple yet adequate information regarding the correct use of flaps.

In straightside tires for passenger cars the flap is supplied separately since it has been found that "cemented in" flaps such as are furnished in motorcycle tires soon work loose on account of the heat generated by these larger tires and become dislocated to such an extent as to cause tube pinching. The "floating" flaps supplied in all United States tires of straightside type represent the highest development of this product. They are made of several plies of rubberized fabric and are covered on the tube side with a layer of canton flannel which is turned back over each edge and permanently vulcanized to the main body of the flap. The flaps are vulcanized into the concave shape they assume when mounted in the casing and are provided with a round hole in one end and a slot in the other to allow for proper length adjustment. Their edges are "feathered" and cannot chafe the tube.

To fit properly, the flap must reach to a point on the inside of the casing approximately even with the top of the rim flanges. If the flap is so wide that the edges come above this point, the flap edges have been known to cut into the casing, the tube following, resulting in a ruined tire. On the other hand, if the flap is too narrow there is great danger of one or both of these edges being folded under when the tire is mounted on the rim. This will quickly lead to tube pinching.

The foregoing explanation of the proper fit of a flap indicates the reason for supplying flaps to fit each size of tire on every size of rim on which the tire can be used. For example, it should now be evident that a 33 by 4 tire will require a different width of of flap when used on a 32 by 3½ rim (which is 2.312 inches wide) than when used on a 33 by 4 rim (which is 2.688 inches wide.)

Proper Application

The necessity for using a flap in a straightside casing even when this casing is mounted on a solid base rim is apparent. All straightside tires are built with a rim clearance sufficient to assure easy mounting. The result is that when the tire is inflated on the rim the beads lift off the base an appreciable distance. Without a flap there is nothing to prevent the tube from being blown under the bead toes, and as the tire revolves and these beads move up and down, the tube will eventually be pinched. In the case of a transversely split rim the tube will be pinched in the rim opening.

In applying the flap the end having the round hole must in every instance be placed over the valve first and the slotted end last, thus permitting the flap to adjust itself circumferentially. Failure to observe this procedure is almost certain to result in damage to the tube.

Care should be exercised to have the flap centrally and smoothly placed with respect to the beads of the tire when mounting on the rim. A little attention and care at this point of assembly will repay the labor many times. In addition to seeing that the flap is centrally and smoothly placed with relation to the beads the inner centrally and smoothly placed with relation to the beads the inner tube should be slightly inflated. After assembling, pick up the tire and bounce it rather firmly at three or four places, the casing to be held in a vertical position. This will allow the flap and tube to settle into proper position and prevent the flap being left too high in the tire, where it is likely to remain unless the bouncing is resorted to. Continue this operation two or three times, each time inflating the tube (if necessary) until the flap is in its proper position in relation to the beads.

Attention should also be paid to the valve stem. No tire should be mounted unless the valve stem is seated in a free and straight position. No amount of inflating will straighten a valve stem if the inner tube has been assembled in a twisted position. A complete new start should be made to correct this condition, for if the tire is mounted with a badly twisted valve stem, the tube is greatly strained and trouble is sure to result. If one edge of the flap becomes folded trouble is almost sure to result. A flap which is too wide, if applied off centre, is likely to fold over or to stand out so far from the walls of the casing as to permit the tube to be pinched.



DO YOU REALIZE

That the success of a weld depends upon the proficiency of the operator, the efficiency of the apparatus and the quality of the filler-rod

We use Oxy-acetylene Electric Arc Set

(Self-containing and Portable)

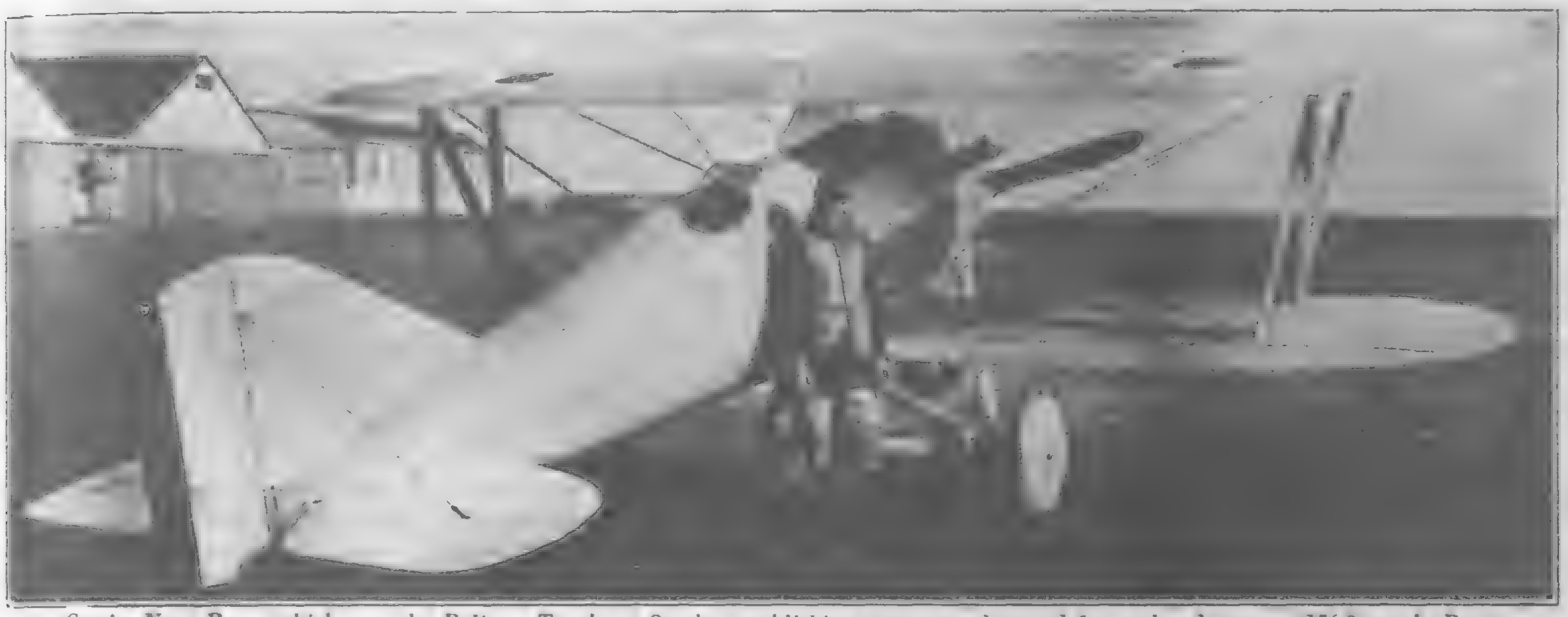
ELECTRIC SPOT WELDER AND THERMIT PROCESS

Our Service means the co-operative help of specialists in the work of manufacturing or repair, with the fusion welding process.

CHINA OXY-ACETYLENE WELDING WORKS

SHANGHAI 1 YUEN-MING-YUEN ROAD CHINA

AIRCRAFT IN 1921



Curtiss Navy Racer which won the Pulitzer Trophy at Omaha, establishing a new speed record for a closed course—176.9 m.p.h. Bert Acosta, the pilot is standing beside the Machine.

(Aeronautical Chamber of Commerce of America, Inc.)

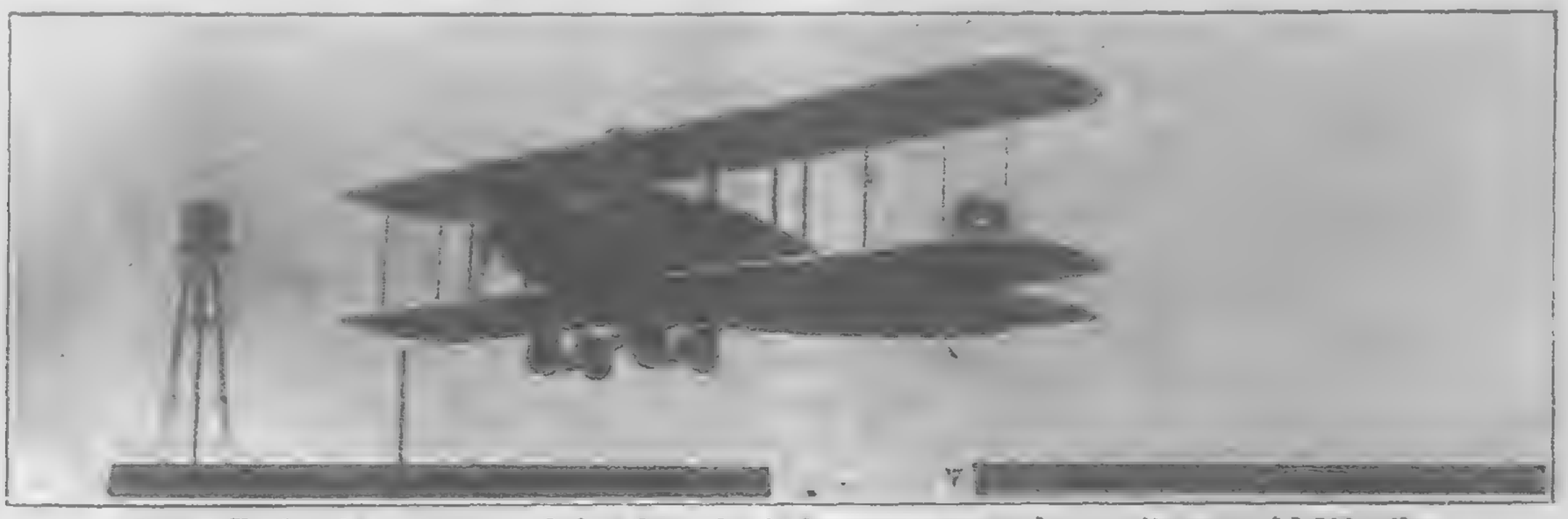
PICTURE an airplane leaving the ground without a human being in it, flying a hundred miles or so until it arrives over its destination, a concentration camp or defenseless city, into which it is sent crashing with its thousands of pounds cargo of high explosives and asphyxiating gases—the entire outfit flown straight to its helpless target, guided and controlled throughout by wireless, says Howard Mingos, in the *New York Times*. Such is the aerial torpedo, not a vision nor the mad idea of a dreamer, but a fact, a product, and only one of the many new things in aviation during 1921.

Imagine a thousand of these engines, two thousand, hurtling out of the skies upon an enemy country, and you have an idea of one grim spectre not absent among others haunting the ordinarily affable sessions of the Washington conference.

It has been a comparatively simple matter to reach an agreement on naval reduction. Navies are expensive. A warship is only a warship, but an airplane is, first, last and always, a carrier, whether it is carrying bombs, passengers or peaceful freight. The subject of aviation has bobbed up now and then at the conference, particularly when the cry of viper warfare is raised, and the flying machine has been added to the list of vipers along with the submarine, liquid fire and poison gas. But while the other vipers have remained vipers and subject to expulsion or suppression, aircraft have been spared.

Not that any of the delegates have discounted the importance of aircraft. Technical experts accompanying each of the delegations at the conference have given aviation a great deal of thought. Bearing in mind the aircraft reference in the agenda of the conference, and remembering further the statement terming commercial aircraft potential naval weapons, is it not arguable that one reason they are willing to scrap their navies is because they know aircraft will be decisive factors in any future struggle on land or sea? It was added testimony, but the aerial warfare demonstration off the Virginia Capes last summer surely convinced the naval experts of other nations as well as our own. And yet they might as well go out and limit the peaceful development of the steamship, motor car and railroad as to tamper with the improvement in flying machines.

To one who follows the sessions closely it is clear that Great Britain openly champions aircraft, maintaining that aerial transport is of extreme importance in developing communication and linking together the scattered dominions of the empire. Japan, only now launching her aerial program, is quite content to avoid discussing it, meanwhile buying up all kinds of airplane equipment and materials in every market in the Western Hemisphere. Six weeks ago, American plane manufacturers trying to buy in their own country certain kinds of wood suitable only for airplane propellers, learned that none was available because the Japanese had purchased the entire supply. More recently, however, hardwood producers have circularized American builders, stating that if they intend to contract for airplane wood, now is the time to do it, as the Japanese will not re-enter the American market again until after the first of the year.



Curtiss Eagle—10 passenger. It has flown for 18 hours continuously or a distance of 1,700 miles

(Aeronautical Chamber of Commerce of America, Inc.)



Sinking of Ex-German Ship "Frankfurt," July 18, 1921

(Aeronautical Chamber of Commerce of America, Inc.)

All of which confirms the belief of experts that aviation is not a welcome subject at the present conference. Undoubtedly there will be another conference at an early date to consider aircraft alone.

The technical experts will be called upon to garner all possible knowledge with the aim of formulating, internationally, of course, the most comprehensive project for using aircraft to maintain amity and good-will among all peoples. They will bring out the flying machine, pick it to pieces, rig it up again, analyze its faults and then its potentialities as an agent of destruction. Finally, it may be predicted they will make another agreement, not repressing aircraft as in the case of the floating fortresses of the sea, but so framing a new "live and let live" policy among nations that war will be too terrible a liability, if you please, for the nation precipitating a conflict.

If it is bad form to discuss the possibilities of a "next war," one's excuse must lie in the world situation as it exists to-day and the little realized advancement of the flying art during the last twelve months. Take Germany, for example. Prohibited from building powered aircraft by the allied council under the terms of the treaty, she has found a way out by devoting her engineering ingenuity and technical thoroughness toward solving the problem of soaring flight, experimenting openly and legally with motorless airplanes, "gliders," to use the aviation term. Remarkable success has been achieved.

In soaring flight, you are imitating the birds. The energy, as with the birds, is secured from two sources, according to scientists who have become authorities on the subject; one, by using air currents having an upward trend, the other by taking advantage of irregularities in the wind. Of the many successful flights made in Germany during the year, that of Dr. Klemperer last August was most spectacular. He soared for five miles from Wasserkuppe to Gersfeld, passing over six villages before landing at a spot only a few feet lower than that from which he had started. In the course of his flight he arose 400 feet higher than his starting point. The result of this practice may be the solution of the motor problem, for by fashioning planes that will remain aloft by use of the winds and air currents it would be possible to secure sustained flight and definite direction with a comparatively small, economical motor. When Germany is ready to compete with other nations, here will be the advantage in having secured valuable knowledge under pressure of national necessity and strict limitations. Nor is it in soaring flight alone that she is progressing, though unable to produce and compete in the open market. Her airship design is improving. She will be the equal if not the superior of any nation when she is ready.

What applies to Germany, restricted as she is at present, might apply to any nation collaborating under a friendly agreement. Thinking cannot be stopped. And if engineers invent devices, their nation is sure to have that advantage in case of conflict. Presumably the next conference, while not limiting aircraft development, will have for its object the recognition of all these principles, and their application to peace only. It will then develop that each great nation is quietly engaged in developing aerial weapons as well as peaceful carriers, building up within its borders, meanwhile, great civilian aircraft manufacturing industries with trained personnel, engineers, pilots and mechanical forces. The new inventions are being employed in peaceful pursuits as far as possible, the heavy bombing machines, for example, being used for civilian transport routes. They literally criss-cross Europe to-day, with junctions at all capital cities. Operated by civilian companies, they are heavily subsidized by their respective governments, because they are the great reserve, the third arm. Aerial charts are being made, wireless communication systems established and laboratories and plants placed in readiness for quantity production whenever emergency demands or public need arises.

Great Britain, France and Germany, and all the smaller nations, are subsidizing their civilian aerial transport, thus making it possible for air lines to operate daily wherever communication is warranted by civil or military exigencies.

The governments are also aiding manufacturers to penetrate foreign fields, sending missions throughout South America and elsewhere. This system creates a market for the surplus equipment



Bomb Exploding near the Ex-German Ship "Frankfurt" during the Bombing Tests of June and July 1921

(Aeronautical Chamber of Commerce of America, Inc.)



Martin Mail Plane carrying 1,500-lbs. or 40,000 letters between New York and Cleveland. Altitude 10,000 feet at 90 m.p.h.
(Aeronautical Chamber of Commerce of America, Inc.)

discarded for newer planes at home. It enables the manufacturer to survive, and encourages the designer in continued effort. Government and manufacturers work hand in hand in perfecting all sorts of devices for increasing efficiency in peace or war. They all are doing it to the absolute limit of their national finances.

Americans returning from abroad are inclined to point to Europe's air lines as models. They comment on the number of planes seen in the air daily over London, Paris, Berlin, Rome, Copenhagen, Warsaw and other capitals. They forget that in European capitals they are in the very centre of national activity, while in America there are many centres, equally important but scattered over a vast area. If figures were available from abroad we should find that there was probably as much flying in the United States these last twelve months as in any three European countries combined.

Statistics compiled by the aeronautical chamber of commerce show that upward of 275,000 persons flew in civilian aircraft here in 1921. Specific reports were made by 107 operating companies for the aircraft year book for 1922. From these reports, and taking into account the lack of official government machinery for checking the roving gypsy pilot and his equally vagabond plane, it is estimated that 1,200 civilian planes were operated in the United States in that period, an increase of 20 per cent. over the preceding year in civilian flying and number of aircraft operated.

And the government has not been idle. Only two months ago the newspapers announced the invention and successful test of the aerial torpedo mentioned in the first paragraph of this article. It has been flown by radio from Long Island to Pennsylvania. The army air service, naval aviation, marine corps and air mail service, in fact, all the executive branches from the White House throughout the departments, have adhered to the policy of developing aviation to the limit of our engineering and inventive ability.

We have our full share of world's records in aviation. Lieutenant J. A. Macready of the army air service last September reached an altitude of more than 37,800 feet over Dayton, Ohio; parachute drops of from 22,000 to 25,000 feet were made by Lieutenant A. J. Hamilton and Sergeant Encil Chambers. There was the closed course speed record made by Bert Acosta in a Curtiss navy racer at the Pulitzer race in Omaha in November, when he covered a triangular course of 150 miles, including fourteen turns, at an average speed of 176.3 miles an hour—260 feet a second. The Loening monoplane flying yacht with four passengers went up 19,500 feet over Port Washington, L. I. A Martin twin-motored bomber, equipped with the engine supercharger, also an American invention, attained a height of 25,600 feet over Dayton, Ohio. All these are world records of importance and significant of our aerial progress last year. Another noted performance was that of the army airplane, which was stopped within fifteen feet after its wheels first touched the ground by means of the reversible propeller.

Our first national airway was opened between Washington, D. C., and Dayton, Ohio, an event of great importance, because it serves as a model for experiment and is a forerunner of the transcontinental highways which will soon form a network across the country, making it possible for fleets of aircraft to travel unerringly and with maximum speed from coast to coast in safety. There is also the air mail, a model for commercial transport the world over. We are to-day matching other nations, plane for plane, bomb for bomb, device for device.

In France they have just erected the most poowerful aerial lighthouse ever known, on Mount Africa, near Dijon, to assist night flying over the principal airways. It is officially said to have a billion candlepower and can be seen by aviators 200 miles away. Here in America, the navy, army air service and air mail service have co-operated in establishing radio stations on the Atlantic Coast and at each of the fourteen principal points on the transcontinental route. Pilots may now keep in touch at all times with weather conditions and by the use of the radio compass, very soon now, pick up their locations at any moment they desire. Night flying is still in the experimental stage here and abroad, the main problem being, not the perfection of direction-finding instruments, but the development of aircraft that will be a positive guarantee against forced landings. While the air mail has maintained better than 88 per cent. efficiency the last year, officials hesitate at present to subject their pilots to the risks involved in night flying. They hope, however, to have the service operating in 1922.

A hundred and five of the larger cities have petitioned the post office department for an air mail service, offering to provide local facilities. It is pointed out that night flying with the mails would save thousands of dollars daily in interest, and exchange on banking and commercial paper. The bankers of Kansas City, Mo., recently estimated that if mail could be flown from their city to St. Louis every night, they would save as least $4,000 daily. Similar saving can be effected elsewhere.

The fire peril has been eliminated from mail planes, through improvements made by engineers attached to the service. New machines recently placed in operation have repeatedly carried mails from the Pacific to the Atlantic in forty-eight hours.

Then there is the forest fire patrol, 41 army airplanes, making a total of 396 patrols in 1921, protecting more than 7,000,000 square miles of valuable timber lands in the national forests on the Pacific slope. Observers in these planes discovered 832 fires in that period. These were extinguished before material damage had resulted.

The completion of the world's largest airship hangar at Lakehurst, N. J., last Fall, was followed quickly by the erection there of a mooring mast for American fighting dirigibles. The United States Steamship *Langley* was turned over to the navy as an



Aeromarine West Indies Airways Passenger Mail Boat Between Key West and Havana, Cuba
(Aeronautical Chamber of Commerce of America, Inc.)

aircraft carrier shortly after successful tests at Philadelphia had demonstrated the practicability of launching aircraft from ships by means of a catapult. Both the Atlantic and Pacific fleets have been augmented by aerial fleets composed of scouting, combat, spotting, torpedo and bombing, and kite balloon squadrons.

Rear-Admiral Moffett, chief of the naval bureau of aeronautics, in his annual report, asserts that the real significance of the catapult lies in the fact that it is now possible to provide all ships with fighting airplanes. Another interesting development, and most important, is the production of helium. The C-7 navy airship was flown over Washington recently just as the delegates and technical experts were leaving a session of the conference.

"That is the first public flight of an airship filled with helium, the non-explosive gas," explained Admiral Moffett to a foreign visitor at his side.

"Yes, and we know only too well that helium is available at present only in the United States," replied the other. "It is, as you Americans say, that you have a corner on it?"

Which is a fact. A by-product of certain kinds of gas found in the southwest, helium offers untold possibilities in lighter-than-air development. It is almost as efficient as the dangerous, explosive hydrogen. Had the Z R-2 been inflated with helium the airship would not have exploded. During the war the government built a great helium plant at Fort Worth, Texas, spending millions on it. The plant has just been placed in quantity production, so that American military airships may fly safely under better conditions and with less risk than those of other nations.

Many improvements were made in the design of airplanes and in the internal combustion engine. Motors were made more reliable. They have become more economical in fuel consumption and more efficient. Several new types are being developed—radial, air-cooled and steam. It is not beyond the limits of possibility that the new year will witness the production of the steam engine for airplanes. Meanwhile the internal combustion motor is being enlarged. The army air service has had one under test at McCook Field, Dayton, Ohio, which develop 700 horse-power, so far the most powerful in this country and the equal of any abroad.

McCook Field is the experimental station of the army air force, just as League Island, Philadelephia, is the scene of naval aviation research. There work was started last year on the Z R-1, sister ship of the Z R-2, and reports indicate that it is being completed. It will be one of the most powerful airships on earth, literally bristling with weapons and capable of cruising from New York to San Francisco and back again without stopping. It, as well as the German airship to be delivered to the United States in 1922, could very likely cross the Pacific Ocean. Then there is the navy "Giant" flying boat under construction at League Island. The hull has been nearly completed. The power plant consists of three units of three Liberty motors each. Each of these units of three motors drives an eighteen-foot propeller, giving the machine three of these great air screws for propulsion. The power plant was perfected and tested successfully by Edson Gallaudet during the last six months. It may go a long way toward solving the problem of continuous flight in large craft, because the use of three engines to one propeller permits one of them to be held in reserve and thrown into action by a multiple gear system, if one of the others develops trouble.

Aided by the government in securing surplus war planes at greatly reduced figures, many commercial air lines have been established. One company reports that in 1921 its fleet of fifteen flying boats flew approximately a hundred thousand miles, carrying 6,814 passengers and 29,002 pounds of freight and mail on routes extending from Key West to Havana, Cuba, and ports along the Atlantic Coast. Within the year at least a half-dozen new types of over-water flying craft have been produced, generally under the supervision of the navy department. At least two of these are amphibious, capable of alighting on and leaving water or land.

The organized air forces, the regulars, are kept busy, aside from war training, patrolling and charting coast lines and the many unmapped regions in the United States and its island possessions.

Early in 1919 Great Britain organized her air ministry to work out the plans formulated by the civil aerial transport committees during the war. Even in the midst of the great struggle British statesmen recognized the importance of aviation and the part it would play in international relations. It was determined to unite the empire by air routes and air forces. The soundness of that idea has since been proved. Throughout the dominions air forces are being maintained with up-to-date equipment, all the result of continuous research, experimental and practical development in England. Nothing in the field of aerodynamical research is too trivial or impossible for the air ministry to undertake. For the attainments which have kept British well in the lead of other nations credit is due the air ministry, with its co-ordination of civil and military aerial activities. This may account for the large number of aeronautical experts accompanying the British delegation to the conference in Washington. There were as many aviation experts from London as from all the other countries together.

The air ministry has found its counterpart in France, Italy and Germany, though the organizations are not identified as ministries. Since the war there has been considerable agitation in the United States for and against the creation of a separate department of aeronautics. It was even proposed to create a ministry of national defense, with war, navy and air co-equal in importance. Various elements in the controversies which occurred with fair regularity and whenever the subject was publicly discussed have been definitely united during the last year, however; and it is now the prevailing opinion of the administration, aviation experts and the chiefs of the score or more of federal bureaus dealing with aviation, that the best intersts of the flying art will be served by the establishment of a bureau of civil aviation in the department of commerce. A bill for providing for such a bureau is now in congress.

Aside from duties solely domestic, and of local importance only, such as enforcement of air law and registration of aircraft and pilots, the bureau of civil aviation will be charged with developing America's aviation reserve strength and maintaining it for mobilization with the army and navy air forces. By that is not meant the national guard, but the civilian transport and the industry at large. It may be seen from this that civil aviation has become officially identified with our policy of national preparedness and that this will be recognized in the organization of the bureau. Being part of national preparedness, it is also a unit in our national defense. Just how important a unit it will become depends upon the decisions of the next international conference.

Lighthouses for Airmen

IN spite of many difficulties speedy progress continues to be made in the organization of transport services by aeroplanes in Great Britain. One of the most important elements in a regular service by aeroplane, especially during winter months, is the provision of adequate light to guide the pilots. Several aerial lighthouses are accordingly being established to enable the services between London and Paris to be maintained without interruption. Two lights are already in operation. Each lamp gives a powerful vertical and horizontal beam and also a distinguishing signal visible to an airman for many miles. The foundations have been laid of another aerial lighthouse which will have a flash light of 56,000 candle power visible under normal conditions for a distance of 32 miles. Another even more powerful light will shortly be added; and when all the lighthouses are in operation regular night services will be established. In connection with British aviation enterprise it is worth noting that there has been a steadily increasing use of the air mail service between Cairo and Baghdad. The average time of transmission by ordinary mail between London and Baghdad is 27 days, but when letters are transmitted from Cairo to Baghdad by air the average time is 12 days and on several occasions the period has been reduced to 10 days. Owing to the success of the service the mail fee has been considerably reduced.



A Goodyear Dirigible

Blimps for Asiatic Exploration

WE are living in a wonderful, advanced age, in which the marvelous development in aviation, during the past few years, has taken place. We are in the habit of thinking of aviation as an entirely new thing, a strictly twentieth century creation. Little do we realize that as far back as 1306, the Chinese understood the laws of ballooning. It is reported that an ascension was made in Peking, China, on the day of the coronation of the Emperor Fo Kiers. Ever since those early days, there has been a slow progress made to master the air, and we find ourselves in the beginning of the year 1922 thoroughly familiar with aviation.

After the past ten years of experimental work in the manufacture and operation of all kinds of dirigibles, we feel confident that it will be the coming method of traveling. Aerial transportation is here and will remain forever.

We have built and flown dirigibles over all parts of the country, over mountains, deserts and oceans, and under all kinds of conditions, heavy winds, snow storms, rain storms and in sunshine, and they have proven to be capable and worthy under trying conditions. They are especially valuable for exploring the interior of jungles and other desolate places, into which there is no other means of transportation. We have used these ships successfully for forest patrol work, as they can land in small openings and discharge passengers, and fire fighting apparatus to combat the flames.

These ships are also very useful in the transportation of mining material to and from mines, where other means of transportation are impossible, or very crude. They have been used successfully in engineering work for flood control and surveying as well. They have a cruising radius up to 3,000 miles and a carrying capacity from one to 20 tons. For further information enquire of the Goodyear Tire & Rubber Company of California, Los Angeles, California.



Great Sport. Fishing from a Goodyear Pony Blimp

New Roads, Siam

WE are told that a project is under consideration for the construction of a main road in Siam from the extreme north of the country to Bangkok, suitable for heavy motor traffic. It is also proposed to build a branch road from the main thoroughfare running from Lampang to Chiengmai connecting this thoroughfare with Sawankalog, and eventually to build a trunk road down to Nakorn Sawan and Paknampoh.

Plans are also in progress for bridge work in addition to that of railway development, and contracts may be anticipated in the near future for concrete bridges along the chief trade routes crossing rivers. Many of the existing wooden bridges are in a ruinous condition and schemes are being put forward to replace them with reinforced concrete structures.

With a view to realization of the foregoing projects renewed attention is being given to the discovery of petroleum in the Muang Fang and Chiengmai districts where the government is at present carrying out experimental boring. A certain amount of private prospecting work has already been done. In regard to minerals as well as oil, expectations are also entertained. Geological examination has proved the existence of iron and coal in north-western districts, while gold, tin and antimony have also been found. Plans for more scientific methods of research are now being considered.

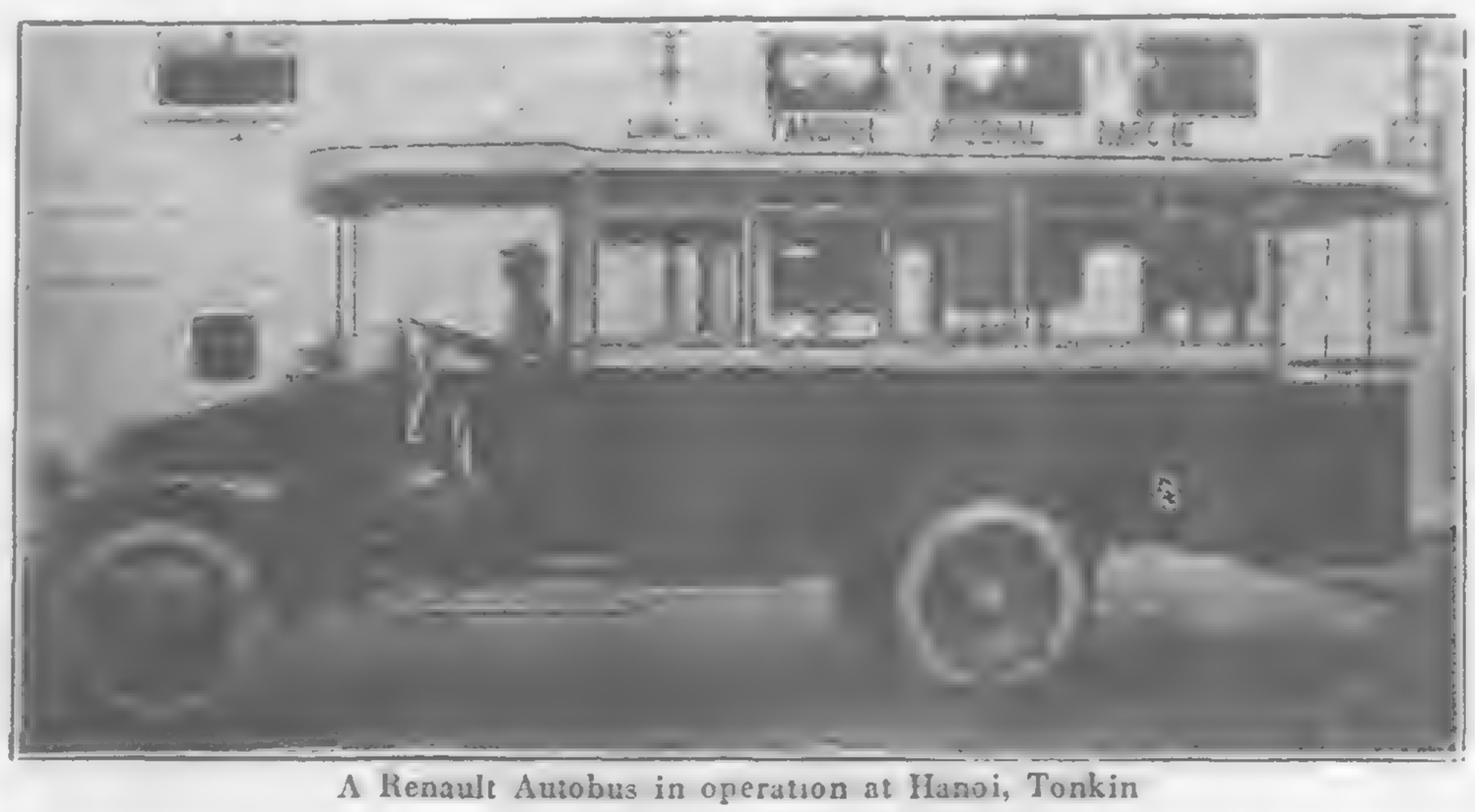
Roads and Automobile Services in Indo-China

THE total length of government highways, projected or under construction in Indo-China at the end of 1920, was 8,372 kilometres, distributed as follows: Tonkin, 2,162 kms., Annam, 2,518 kms., Cochin-China, 80 kms., Laos, 1,770 kms., and Cambodia, 1,112 kms. The local roads in the various provinces in the colonial union now open to traffic form a ststem of 16,395 kms., of which 4,026 are macadamized. Tonkin enjoys the greatest development in local roads with 5,280 kms. followed by Annam with 4,874 kms. In Cochin-China, the present provincial or local road system has a length of 1,415 kms. A comparison of the present highway system of the colony with that of 1912, will show something of the construction work carried out during this period resulting in a doubling of the entire mileage and with nearly 7,000 kms. of new metalled roads.

1912: 2,831 metalled; 10,609 dirt; 131 in construction; Total, 13,571 kms.

1920: 9,842 metalled; 8,557 dirt; 8,445 in construction; Total, 26,484 kms.

A glance at the road map of Indo-China which illustrates this article, will show that within a short time Saigon will be connected with Siam by a macadam road (No. 1) passing through Pursat and terminating at Sisophon, with a dirt road extension to the frontier. A macadam road (No. 16) also connects Saigon with Baclieu passing through Mytho, Cantho and Soctrang, with a dirt road extension to Camau at the tip of the peninsula. Another macadam road (No. 17) connects Pnom-Penh, the capital of Cambodia, with coast, passing through Kampot and terminating at Hatien. From Oudong in Cambodia another metalled highway (No. 1 bis) is under construction, passing around to the north of the Great Lake of Tonle Sap, through Kompomg Thom and the world famous ruins of Angkor, terminating at Sisophon. A macadam road (No. 15) also connects Saigon with Cap St. Jacques; another (No. 13) with Loc-ninh. This last is to be extended to Stung-trang via Kratie and Sambor.



A Renault Autobus in operation at Hanoi, Tonkin

The mandarin highway (No. 1) connecting Saigon with Hue and Hanoi is metalled throughout except for the short distance between Phan-thiet and Phan-rang. It is, however, possible for vehicles and automobiles for its entire distance. The Mandarin Road, it will be noted, starts at Langson, the Gate to China, and follows along the coast through Hanoi, Hue, Saigon and continues west through Pnom-Penh to Sisophon, to connect ultimately with the Royal Siamese Highway to Bangkok. It is the backbone of the colonial road system connecting all, the capitals of the various petty states, a veritable king's highway, along which, in the not distant past, passed in Oriental pomp and splendor, the embassies and missions of the kings of Cambodia, Cochin-China, Annam and Tonkin on their way to pay tribute to their overlords at Peking. With the completion of the Saigon-Sisophon road and the Siamese highway from the frontier to Bangkok, it will not be long before auto enthusiasts will be able to motor through these picturesque lands to the Malay peninsula and down to Singapore, undoubtedly one of the greatest scenic routes of the world.

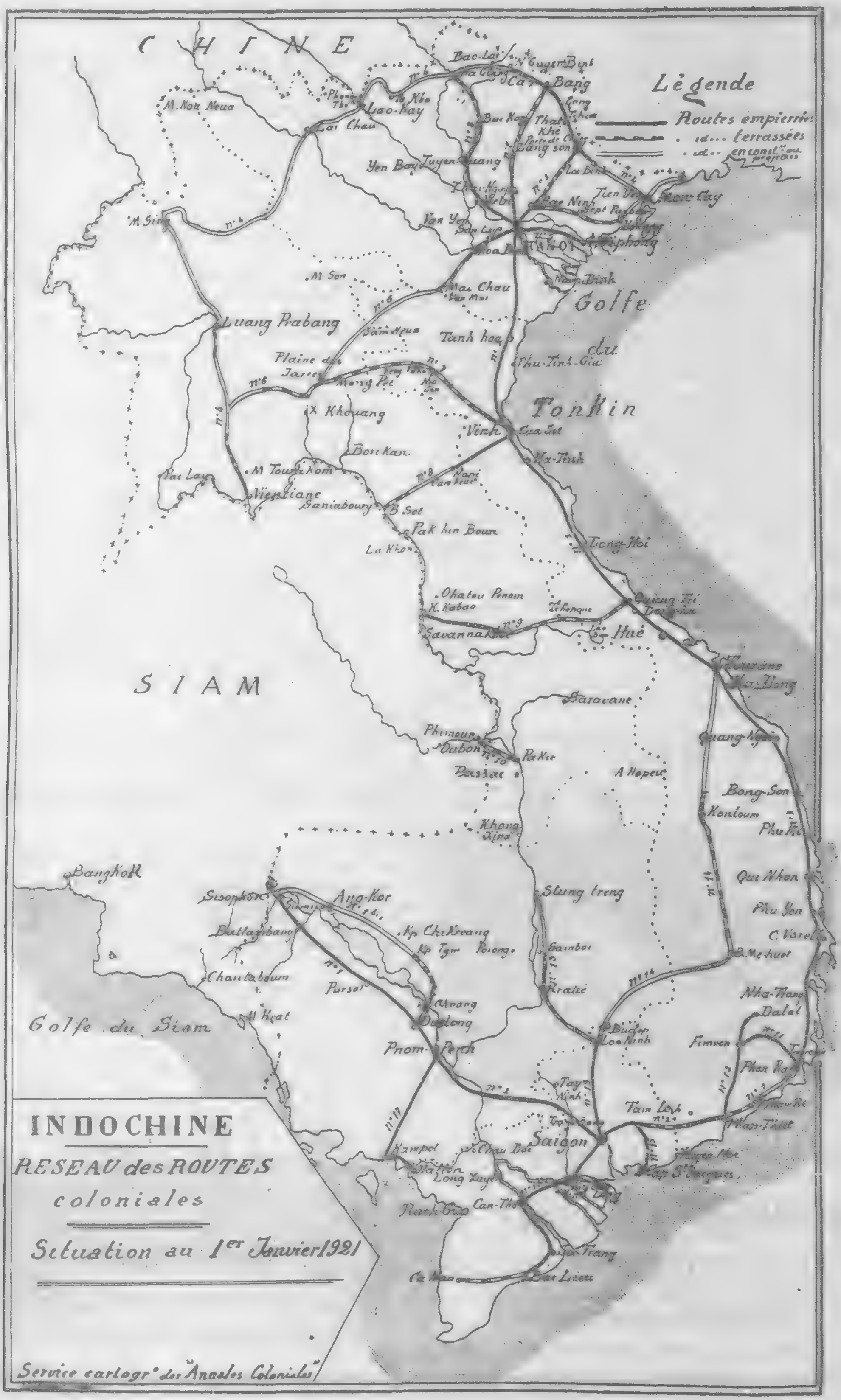
From Phan-thiet and Phan-rang on the main mandarin highway, macadam roads (Nos. 11-12) lead to Fimnon and there unite to continue further up into the high lands to the Dalat sanatorium, the great health resort of southern Indo-China. From Loc-ninh on the Cambodia-Cochin-China frontier runs a dirt road (No. 14) which will be converted in time into a metalled highway connecting Saigon with Tourane, passing through the high lands of Annam inhabited by the semi-savage Mois.

In Tonkin, we find macadam roads connecting Haiphong with Hanoi (No. 5); Hanoi with Langson (gate to China) (No. 1) metalled for about two-thirds of the distance; from Hanoi to Caobang (No. 3) passing through Thai-Nguyen and Bac-Kan; from Hanoi to Ha-Giang (No. 2) metalled as far as Tuyen-quang; from Bac-Ninh to Moncay passing through Hongay and Tien-yen; and the frontier military road (No. 4) from Moncay through Langson, That-Khe, Caobang, Bao-lac, Ha-Giang to Laokay.

The roads for the development of the Laos country consist in the one from Quang-tri to Savannahket passing through Tchepone (No. 9) which is metalled for one-half its length; the road from Vinh to the Mekong River (No. 8) is metalled as far as Nape. Construction on the section from this point to the Mekong is now under way. The road from Vinh to Mong-pet (No. 7) is to be extended to connect with the projected great frontier highway (No. 4) linking Ventiane on the Siamese border with Loakay and the other leg of the frontier road skirting the Chinese border, to the sea at Moncay. Another road will start at Mongpet (No. 6) and connect with Hanoi through Moa Binh. There is another short horse road (No. 10) in southern Laos connecting Pakse with Phimoun on the Siamese border.

All the above roads are maintained under an appropriations of the colonial government and their enumeration gives some idea of the possibilities for the expansion of the automobile business in a country one and a half times larger than France having 5,500 kilometres of good roads over which automobiles can operate at all seasons of the year.

The first automobile was imported into Indo-China in 1902 by Mignot Freres, bicycle dealers of Saigon. At the end of 1920, there was 1,730 machines in the colony; in Laos, 14, in Cambodia, 120, in Annam, 138, in Tonkin, 400, and in Cochin-China, 1,058. Of this total, 195 were employed for public transportation, 75 are motor trucks and more than 1,450 touring cars of all class.


CHINE
Légende
Routes empierrées
id... terrassées
id... en const. ou projetées
Bao-Lai
Cao Bang
Lao-kay
Lai Chau
Yen Bay
Tuyen Quang
Lang son
Mong Cay
Pac Ninh
Haiphong
M. Son
Mau Chau
Golfe du Tonkin
Luang Prabang
Tanh hoa
Plaine des Jarres
Moung Pet
X Khouang
Vinh
Ha-Tinh
Bon Kan
M. Tourakom
Pac Lay
Vientiane
Paniaboury
B. Sot
Pak hin Boun
La Khon
Tong-Hoi
Chateu Peroun
K. Kabao
Savannakhet
Thanaque
Hué
Tourane
Kontoum
Bong-Son
Phu Yen
Qui Nhon
Nha-Trang
Dalat
Phan Rang
Phan-Thiet
Saigon
Tay Ninh
Tam Lanh
Khong
Xieng Khouang
Stung treng
Kratié
Pursat
Battambang
Chantaboun
Kompot
Bangkok
Golfe de Siam
Ream
Can-Tho
Bac Lieu
Ca Mau
SIAM
INDOCHINE
RESEAU des ROUTES coloniales
Situation au 1er Janvier 1921
Service cartogr. des "Annales Coloniales"

Public Automobile Services in Indo-China

TONKIN

1. Haiphong to Doson, 25 kilometres.
2. Dong-anh, Thai-nguyen to Bac Kan, 141 kms.
3. Phu-Tho to Tuyen-quang, 60 kms.
4. Vinh-Yeh to the High Altitude Station of Tam-Nao (from May 15 to October 15) 25, kms.

ANNAM

1. Vinh to Dong-ha, 293 kms.
2. Tourane to Qui-Nhon, 300 kms.

COCHIN-CHINA

1. Saigon to Tay-ninh, 100 kms.
2. Saigon to Cap Saint-Jacques, 124 kms.
3. Saigon to Thudaumot, 36 kms.
4. Saigon to the Cambodian Frontier (Pnom-Penh line, terminus at Banam), 200 kms.
5. Various interior services ; Saigon-Gocong ; Gocong-Mytho : Tay-ninh to the Cambodian frontier ; Vinh-long to Travinh ; Vinh-long to Sadec ; Cantho-Long-xuyen ; Cantho to Vinh-long ; Soctrang to Bac-lieu ; Bac-lieu to Camon ; Chaudoc to the Cambodian frontier.

CAMBODIA

1. Saigon to Banam (part within Cambodian territory), 105 kms.
2. Pnom-Penh to Battambang and Sisophon, 306 kms.
3. Pnom-Penh to Kampot, Kep, Hatien and Giang-thanh, 248 kms.
4. Pnom-Penh to Chaudoc (within Cambodian territory), 138 kms.

Details of Principal Automobile Services

A. *Krongpha-Dalat ;* Leave Krongpha, Saturdays at 7.30; from Delat, Saturdays at 14.15, on Monday at 12.15 ; Duration of trip, 4 hours. Provisional Service (4 passengers or less) at any time. Other day : leave Krongpha at 7.30 and Dalat at 12.15.

B. *Automobile Service of E. Planchais of Travinh ; Travinh to Tiencan ;* two round trips daily.
Travinh to Tracu : two round trips daily.
Travinh to Olac : two round trips daily.
Travinh to Vinh-long : one round trip daily.
Vinh-long to Sadec : two round trips daily.
Vinh-long to Chomoi : one round trip daily.
Travinh to Macbat : six trips weekly, time 20 hours.

C. *Thudaumot to Laithieu :* Postal service, four round trips daily.

D. *Thudaumot to Honquan and Locninh :* three services weekly.

E. *Phnom-Penh to Kep :* two round trips weekly, time about six hours.

F. *Phutho to Tuyen-quang* (Sanguet's Service) : one round trip daily connecting with trains. Time about 2½ hours.

G. *Vin-yen to Tam-dao* (24 kms.) : two trips daily connecting with Hanoi trains and with chair porters for the summit.

H. *Dong-Anh to Thai-Nguyen* (56 kms.) : two trips daily.

I. *Haiphong to Doson* : Regular service. Fare, Pias. 1.25, round trip, P. 2.00.

J. *Vinh to Dongha* (203 kms.) : (*a*) Subsidized service daily. (*b*) Societe des Transports Automobiles ; three round trips weekly stopping at Donghoi over night. Tariff, .02 per kilometre-autobus.

K. *Tourane to Quinhon* (322 kms.) : Subsidized Service of Leroy, Tutier & Co., of Tourane, concessionaires. Regular service. Time, 12 hours 30 minutes. Tariff, first class, Piasters 25.75 ; 2nd class, P. 16.10.

L. The Etablissements Claudius Perrin, of Saigon, operate a passenger autobus service in that city. The machines are of the same type as are used in Paris but smaller and have pneumatic tires, giving greater comfort and less wear on the roadway. They have four autobuses and operate two lines of passenger service within the city and charge a fixed fare of ten cents (silver) for the trip of about twenty minutes.

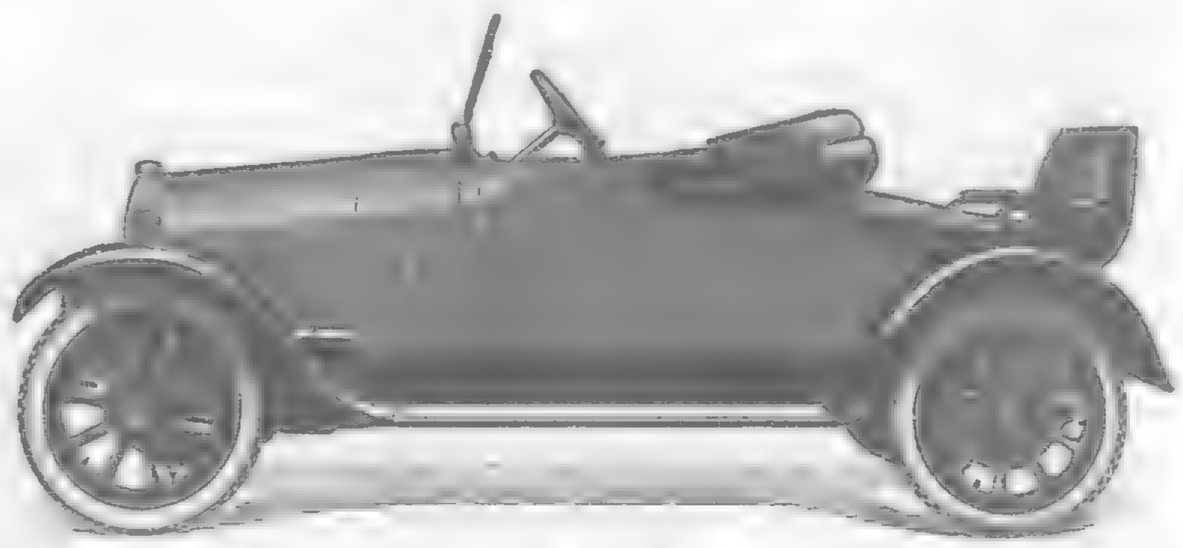
Humber

The First Consideration

NOW more then ever the choice of a new car turns largely upon the questions of first cost and economy of upkeep. In these respects a HUMBER may challenge comparison, for in view of the exceptional quality of materials used and the studied perfection of every detail of construction, the first cost of a Humber model is undoubtedly reasonable ; while the testimony of Humber owners is unanimous as to the low cost of upkeep. Convincing proof of this can be supplied to any intending purchaser who will write for illustrations of the latest 10 H.P. and 15.9 H.P. models.

Full particulars on request

HUMBER LIMITED
WORKS
COVENTRY, ENGLAND



10 h.p. Four-Seater (R.A.C. Rating, 11.4 h.p.)

Japanese Aviation

AIRCRAFT manufacturers should follow closely the developments in Japan, as considerable activity along the line of airplane construction indicates an increasing demand for such means of communication and possible opportunities for sale of airplanes.

The establishment of an aerial training school in Nagoya and the organization of the Lake Aerial Excursion Co. is contemplated by a civilian aviator of Kyoto. The latter is planning a visit to the United States for the purpose of purchasing a 400-horse-power 8-seater plane.

The reopening of a civilian aviation school at Nagoya, which was temporarily closed, is being planned.

The Mitsubishi Motor Co., at Nagoya, has made progress in the work of manufacturing its new type of airplane, and will soon be turning out complete machines. The company's application for permission to establish an aviation field in front of its works at the port has received official sanction.

A trial flight with an experimental airplane completed by these works, in which a 300-horse-power Hispano-Suiza motor was installed, showed satisfactory results. The airplane was constructed after the plan of a British engineer; while the details of construction are kept secret, it is said to be a high-speed fighting plane, to be known as the Mitsubishi type. The company plans to undertake construction of this type of biplane.

Work has been started by the Aichi Tokei Denki Kabushiki Kaisha (Aichi Clock & Electric Machinery Co., Ltd.) on the construction of a factory in the neighborhood of Nagoya to which the works of the company, now at Atsuta, will be moved. It is expected that the factory will be completed by the end of 1922. The present works are capable of turning out one airplane a month, ofthe Yokosho type; the new factory will have a capacity of 50 planes a month. Besides the manufacture of airplanes for military purposes, special attention will be given to the production of large commercial planes.

The Kawasaki Works of Kobe are contemplating the erection of airplane factories in the Gifu prefecture. Construction was scheduled to be started in November, 1921, and to be completed in the spring of 1922, when 500 workmen will be detached from Kobe to engage in the manufacture of airplanes.

Japan Orders Trucks

THE city of Tokyo has made large purchases of motor trucks recently. The sewage department purchased 35 Ford one-ton trucks, which will be fitted with covered stoke bodies of special construction. The same department also purchased 12 Packards, the EC two-ton model, eight of which will be fitted with dump bodies and vertical hoists of Japanese construction, and four with platform and stake bodies. All of the trucks will be used for the disposal of sewage in Tokyo.

Osaka and Nagoya will soon be on the market for more trucks. The department of communications of Nagoya has purchased a two-ton Garford, fitted with pneumatic tires and a special body.

European light cars continue to lead in local passenger car sales, with every indication of increased popularity. The Fiat 501, which was the outstanding success of this market in 1921, remains in the lead, with Citroen, Bean the Renault 10, and the Ishikawajima Wolseley also doing fairly well. Many local agents are now adding cars of this class to their lines among which may be mentioned the French DFP and Mathis, and the Dnglish Beardmore, American six-cylinder cars are not in demand.

The 10 horse-power Renault is becoming one of the most popular light cars on the Japanese market. Sedans of this model were recently delivered to the Mitsui Bank and the Shibaura Engineering Works.

The Kobe branch of Mitsui Bussan has purchased a Packard Single Six, with Japanese limousine body.

"White" Coaches for Hongkong

THE official run of the six new motor-coaches, with which the Hongkong Hotel Company intend to maintain a regular service between Hongkong and Repulse Bay Hotel, was held on Feb. 11. The first public service will be given during race-week, when the Company hope to use all six coaches in relieving traffic congestion between town and Happy Valley. The limousine coaches are from the White Company, fitted with 40-h.p. engines. The body is enamelled to a shade of Packard blue, and bear on either side of the car the creast of the Hongkong Hotel. The bonnet of the car is black. The roof is double-lined with leather and the sides, from the chassis to the roof, are open. In rainy weather the sides can be closed by means of leather drop curtains fitted with celluloid windows.

The coaches, which are 7-ft. 4-in. wide (over all), seat 12 passengers comfortably. The passengers enter the bus from the back and a gangway runs down the centre. There are five seats taking two passengers each and two single seats at the back. The interior is upholstered with dark leather. Five electric domes are fitted to the roof and bells are fixed alongside each set of seats, so that the passengers can signal to the driver to stop. The coaches have been specially built to suit the colony's roads. The same type of vehicle is very popular in California, for regular long-distance runs.

Osaka's New Roads

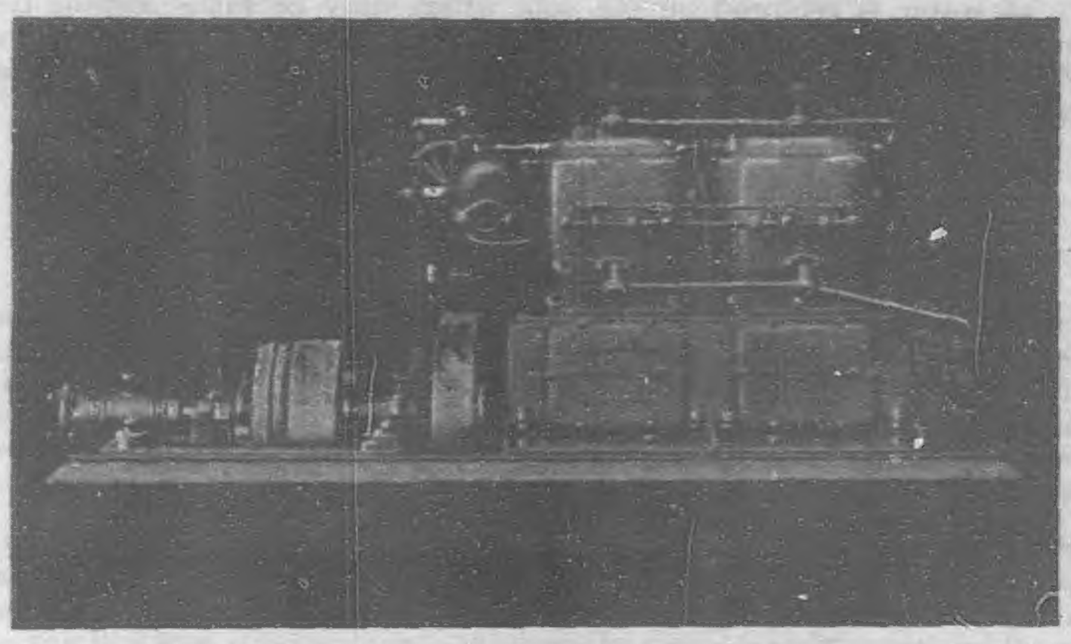
THE city of Osaka has announced a most ambitious road building program, which, it is expected, will extend over a period of some seven years, costing in the neighborhood of Y. 140,000,000. The Osaka planning committee has expressed the opinion that the work should be started at once.

Owing to the fact that more than half of the present fiscal year which is from April, 1921 to March, 1922, has elapsed, it is proposed by the committee to spend only Y.7,015,000 this year. An appropriation providing for this outlay will soon be introduced in the municipal assembly for its approval. This sum will be dispersed as follows: Y.5,317,722 for the expansion and construction works, Y.1,169,180 for the repair of the present roads and Y.528,098 for the readjustment of roads.

How to raise this huge sum, chiefly devoted to road improvement works, is receiving careful consideration of the city planning commission. With a view of carrying out this important work smoothly, the commission was augmented by several additional members who were selected among the prominent business men in the city, Mr. Toyoda Obata, vice-governor of the Osaka prefecture office, and Mr. Hajime Seki, assistant mayor of Osaka, were newly elected as chairman and vice-chairman of the commission respectively.

It is proposed by the committee to float a municipal loan of some Y.75,000,000 to be redeemed in 50 years. It is also hoped by them to obtain some Y.35,000,000 as a subsidy from the central government, the rest of the fund being raised by increasing the municipal taxes for amusement, entertainment, automobiles, rickshaws, bicycles, motorcycles, wagons and various other vehicles. It is also intended to increase tae city tax now

GLENIFFER
KEROSENE & PETROL MARINE MOTORS



FOR ALL TYPES OF BOATS
RANGE OF MODELS—10 TO 90 H.P.

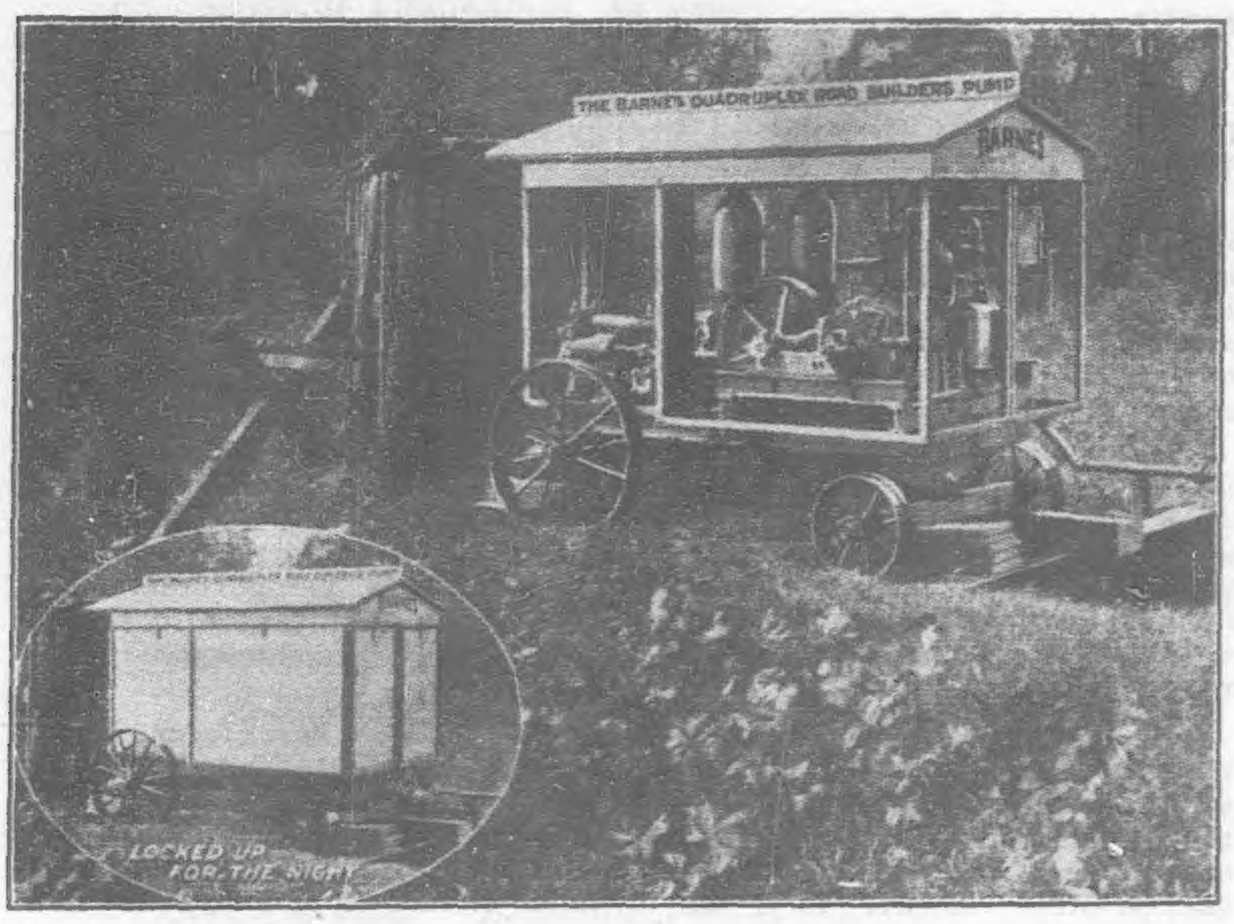
AGENTS:—Douglas and Grant Ltd.—at Madras, Rangoon, Bangkok, Saigon, and Haiphong.
Ritchie and Bisset—at Singapore.
British and Dutch Engineering Co., Ltd.—at Batavia and Soerabaia.

GLENIFFER MOTORS LTD.
ANNIESLAND, GLASGOW, SCOTLAND.
TELEGRAMS: "GLENGINE, GLASGOW."

being levied upon the local tramway lines. Besides the scheme it is primarily intended to improve and expand the roads, It is also projected by the city planning commission to improve the city's sewer system, the hygienic plants and other civic improvements along the permanent scale for the future of the greatest commercial and industrial metropolitan city in the Japanese empire.

Road Builders Pumps

PUMPING water on road jobs is hard work and a pump must be built right to stand up under this service. A pump must also be built (especially for work in China) which can be locked up at night when it is not in service with a reasonable expectation that the brass fittings and other easily detachable parts will be in their proper place in the morning. To meet the many exactions of a reliable pump for road building purposes, the Barnes Manufacturing Company of Mansfield, Ohio, have completed a



line of special pumps for this purpose. The one shown in the accompanying illustration was employed on a section of the Lincoln Highway near Beaver Falls, Pa., where the most severe pumping conditions were encountered. In reporting on its work, the contractor states "we pushed the water through 21,000-ft. of 2-in. pipe and over a hill 310-ft. high and still got an ample supply for eight sprinkling hose and a 21E paver. We broke the state record for road building with this outfit and the Vuadruplex never failed us. "These pumps are built to be driven with any kind of power, and should prove of value in solving the many road building problems in China where a constant supply of water is required on the job, which may be miles distant from the nearest water supply. The agents of the Barnes pumps in China are the Walworth International Company, with offices at 22 Kiukiang Road, Shanghai.

Body Building in Japan

As a result of the discrimination in the tariff laws of Japan against complete automobiles, there has developed a considerable industry in the manufacture of automobile bodies. Almost every dealer in automobiles in Tokio, where the industry has shown the most rapid development, has facilities for building automobile bodies to order, and it is estimated that from 150 to 250 automobile bodies can be manufactured in Tokio each month.

Many purchasers prefer to have the bodies for their automobiles built in Japan, because it is possible to manufacture a body that will accommodate seven Japanese persons, besides the driver, and mount it upon the chassis of a small car, thus effecting a considerable economy in both cost and upkeep. Such a body could not contain seven average Americans, but the small stature of the average Japanese makes the arrangement possible.

Japan's Motor Imports

ACCORDING to an American consular report, 1,745 automobiles, valued at $2,425,518, and automobile parts to the value of $2,798,141 were imported into Japan during 1920. The total value of automobiles imported in 1919 was $2,757,473 and the value of automobile parts was $2,866,754. The number of automobiles imported in 1919 was 1,579, which indicates that a larger number of medium and low-priced cars were imported in 1920 than in 1919. The value of automobiles and parts imported from the United States was $5,405,818 in 1919 and $5,015,130 in 1920. Italy exported automobiles to Japan amounting in value to $138,041 in 1919 and $9,889 in 1920. No other country had an important share in the Japanese automobile imports in these years. In recent years the value of automobile parts imported into Japan has exceeded the value of the automobiles imported, the excess being relatively much greater in 1920 than it was in 1919. This is explained by the fact that approximately 60 per cent. of the motor vehicles imported into Japan are shipped as unassembled parts of cars, and not as complete automobiles, a practice which is the result of a discrimination in the tariff in favor of automobile parts, together with the saving in freight charges that can be made by the closer packing. As a rule the chassis and other smaller parts are imported without the body, which is built in Japan.

Japanese Unique Selling Plan

SPEAKING of the community idea, consider the Japanese concern that is doing business on a basis of selling an Oakland Six touring car to 200 Japanese. The company was organized in Japan with an initial capital of $150,000. The initial purchase of the company was 55 Oakland Six touring cars, which have been sold to 11,000 Japanese. Strange as it sounds, here is the plan under which the company operates.

Each stockholder in the company pays ten dollars and in return receives a one year's interest in an Oakland Six touring car. The year has been divided into days and hours and a specific time allotted for each stockholder to take a ride. For example, a man is notified that his lime will be from, say every other Thursday from eleven o'clock to three. The plan has been carried out with 200 owners of each car so that four people go out with the driver during the hours allotted to them, so many times each year, at a total cost of $10 each. This arrrangement nets the Japanese concern $2,000 for each car sold and gives the Jap automobile enthusiasts the satisfaction of being a car owner in return for the very modest investment of $10.

The Oakland sixes used in the unique selling plan are standard Oakland Six touring cars, and were purchased through the Oakland dealer in Seattle, Wash.

While it is difficult to imagine an American accepting a one two-hundreth interest in an Oakland six, the fact remains that 11,000 Japanese have become enthusiastic over the proposition to date. And latest reports from the Far East indicate that the number of "community" Oakland Sixes is constantly increasing.

Motor-Car Market in Japan

WHILE the automobile industry in Japan is depressed at present, its prosperity during the past several years was remarkable, according to the *Japan Times and Mail.* The number of automobiles in Japan at the end of 1913 was 892, the majority belonging to the government offices; the figure increased to approximately 10,000 at the end of 1920.

The following table shows the numbers of cars registered in Tokyo and in Japan as a whole according to official Japanese statistics:

Years.	All Japan.	Tokyo.	Years.	All Japan.	Tokyo.
1913 ...	892	—	1918... ...	4.533	2,079
1914 ...	1,066	—	1919... ...	7,051	3,056
1915 ...	1,244	610	1920... ...	9,998	3,695
1916 ...	1,648	841	1921 (July)...	—	3,781
1917 ...	2,672	1,326			

From these figures alone it would appear as though Japan might be considered an increasingly good market for motor cars; but the facts are rather to the contrary, as the increase in number of cars took place under flourishing economic conditions, while at present circumstances are against the sale of cars. In addition to the chief drawbacks, which are poor roads and weak bridges, the high price for the purchase and maintenance of cars affects the market very unfavorably.

A Japan Made Motor Car

THE first Japan-made motor car is now on the market. It is called the "Midget," and is designed to meet the peculiarities of Japanese roads and local conditions. Its wheel-base is only eighty-four inches and its total weight 850 pounds. It is driven by an air cooled motor of twelve horse-power, and this part of the car is made in Indianapolis.

Motor Cars in South China

THE sale of motor vehicles in Canton has benefited by the street improvements. In 1918 there were only 10 motor cars in the city—all owned by officials—and a few hundred rickshaws. On July 1, 1921, there were 150 motor cars, 25 motor cycles, and approximately 3,000 rickshaws registered with the municipality. The motor cars include 18 autobuses operated by the Canton Tramway Co., pending the building of the street railway system, for which the company has the franchise. The number of motor vehicles imported, according to the Chinese maritime customs service, is as follows: In 1918, none; in 1919, 20 cars and 19 motor cycles; in 1920, 128 cars and 3 motor cycles; in the first six months of 1921, 18 cars and 3 motor cycles.

All motor cars in Canton, so far as can be ascertained, are of American manufacture; unfortunately, most of them are second-hand. Only one firm in Canton which has the agency for American cars, and this firm has no service station. None of the so-called "garages," of which there are now 32, are equipped to supply spare parts or to do repair work except of the very simplest nature.

Since January 1, 1920, the city of Canton has made considerable progress in street building. Prior to that date Canton had only six miles of streets over which a motor car might pass. None of these ran through the city proper, but merely along the river front and eastern suburbs. The major part of the city, where nearly 1,000,000 people live, had no streets suitable for wheeled traffic.

By July 1, 1921, the city had completed, except for the final concrete surfacing, nine additional miles of modern streets, varying in width from 80 to 150-ft., with sewerage laid down in the entire length and running through the heart of the city. In addition, it had 7½ miles under construction which are expected to be completed by the end of the year. The streets are built of a foundation of crushed brick and stone, with a surfacing of concrete, and are well graded.

To accomplish this program the municipality had to tear down 5,000 houses, 15 city gates, and 6½ miles of old city wall, and had to fill in 1,300-ft. of canal. Some other new streets have been built on the site of the old city wall, which was torn down for the purpose, and along the route of old canals.

Trucks in Hongkong

A DECIDED improvement in the market for American motor trucks became evident in Hongkong in the early part of November. Within a few weeks orders were placed in the United States for a total of 11trucks. Previously the number of commercial vehicles in the colony had never exceeded seven.

This increased use of trucks is due to better roads. The first motor road to the Feak is now in course of building, at considerable labor and expense. It has already been completed to the upper level and will soon be carried along the crest. Another road is being built across the hills to the other side of the island. These roads not only will open up many new building sites but will permit truck delivery of freight to portions of the island that are now inacessible except by coolie carriers. There are about 470 passenger cars in the colony, the great majority of them American.

Marine Motors in Canton

THERE is a good potential market for marine motors in the Canton consular district, according to Vice-Consul Ernest B. Price. To illustrate the situation, a brief preliminary survey of the transportation conditions in South China should be given. If a circle were drawn with a radius of 25 miles, with its centre about 25 miles down the Chu Kong, or Pearl River, from Canton, it would comprise a land and water area of about 1,900 square miles and a population of not less than 10,000,000, or approximately 5,200 persons per square mile. This region, known in South China as the Canton Delta, is not only one of the most densely populated areas in the world but comprises, at the same time, one of the finest networks of natural waterways to be found anywhere. The circumference of the circle so drawn would include or touch at least ten cities, each with a population of 75,000 or over. Within this area is grown nearly half the quantity of rice needed to supply the 30,000,000 people of the province of Kwantung. This populous and prosperous region has less than 200 miles of railway.

As the purpose of this report is primarily to indicate a possible market in Canton for marine motors, no attention will be paid to the tonnage of ocean-going vessels entering and clearing at Canton. Of the non-ocean-going vessels, the number entered and cleared at Canton in 1920 under inland steam navigation rules (vessels registered for Chinese inland waters navigation only, and including both steam and motor driven craft), according to the Chinese maritime customs for 1920, totaled 54,235, with a tonnage totaling 836,140. During the same period 6,119 non-ocean-going vessels of 2,383,210 tonnage entered and cleared at Canton under general regulations (vessels capable of plying to Hongkong and Macao, as well as inland ports). These vessels included 3,534 river steamers (2,264,594 tons), 473 lighters (77,755 tons), and 2,112 launches (6,119 tons.) In addition to the above the customs records show that 8,293 native cargo-boats, not power driven, entered and cleared at the port in 1920. Of a total of 1,719 vessels registered in all China under inland steam navigation rules in 1920 (in which class are included motor-driven craft), 542 were registered in Canton. Of this number 493 were steam and 49 motor driven. Of the 49 registered motor-driven vessels 16 were registered as combined cargo and passenger carriers and 33 as pleasure boats. As the registration of pleasure boats is not compulsory, however, it is believed that there were at least that many unregistered.

Of the 542 registered vessels plying the inland waterways of the Canton Delta the vast majority are launches used for towing passenger and cargo junks, by which form of conveyance the great bulk of the passenger and freight traffic in the Delta is carried on. It is in the supplying of American marine motors (particularly the type operating on fuel oil) for this type of vessel that it is believed a market exists.

While there is, and probably will continue to be, some demand for gasoline and kerosene marine engines in pleature craft, the high cost of both gasoline and kerosene acts as a powerful restriction. But in view of the lower operating and stand-by expenses of fuel-oil engines as compared with steam engines it is felt that there is an excellent potential market for fuel-oil engines to be used in tow launches in the Canton Delta, and possibly for other applications.

FURTHER BIG REDUCTIONS

DENNIS

COMMERCIAL MOTORS

Practically back to Pre-War Prices

Type	To-day's Price	Price Jan., 1921	Reduction
2-2½-ton Standard Lorry Chassis...	£730	£ 997	£267
2-2½-ton Long Char-a-bane Chassis	£750	£1,007	£257
3½-4-ton Lorry Chassis	£865	£1,195	£330
3½-4-ton Char-a-bane Chassis ...	£880	£1,190	£310
4-ton Long Wheelbase Omnibus Chassis	£950	£1,200	£350
5-6-ton Lorry Chassis	£960	£1,320	£370

The prices given above are F.O.B. Guildford, England

WITH a view to stimulating trade and maintaining employment, we have written down our Stocks to a figure very much under cost, and this, with the wages reductions that will take place in the near future, has enabled us to sell our Chassis as from October 1st at the prices mentioned opposite.

Purchasers of "DENNIS" vehicles, even at such low prices, can feel perfectly assured that they are acquiring absolutely new goods of latest and most improved construction, as Dennis Brothers have never purchased or taken back second-hand War Lorries. The Vehicles we are offering are absolutely new and embody improvements on previous models. We have been able to keep our factory busy on new productions, and are not selling Chassis made two to six years ago and re-purchased from the Government, nor are we offering re-conditioned War Chassis.

WRITE FOR PARTICULARS:—

Agents:

Messrs. Wearne Brothers, Ltd., 310 Orchard Road, Singapore.
Messrs. Perrin Cooper & Co., Consular Road, Tientsin.
Messrs. Central Garage Co., 9 Hongkong Road, Shanghai.
Messrs. Alex Ross & Co., Ltd., Machinery Department, Hongkong.
Messrs. Fikkert Motor Car Co., Weltevreden, Batavia.

Cables: A.B.C. 5th Edition, Lieber's, Bentley's, Marconi.

DENNIS BROS., LTD.

GUILDFORD, ENGLAND

D 221

AUTOMOTIVE NOTES.—New Roads, etc., in China

TWO AUTOMOBILE COMPANIES, SHANTUNG.—Two automobile transportation companies are being organized in Shantung to run autobus service on the Yucheng-Tungping automobile road lately built by the American red cross on behalf of Chinese, more than 200 *li* in length, and on the Tsining-Lohsien automobile road respectively. The Yucheng-Tungping line is to be operated by Mr. Pao Lien-sui, offering a road hire of $15.10 per *li* to the road administration of Shantung, and the Tsining-Lohsien line by Mr. Chu Hai-shan at a rent of $16 per *li*. Automobile roads are also being planned to be built from Cheng-teh to Tsinan and from Kaifeng to Tsining.

SHANGHAI-MINGHONG-NANWAI-CHOLING AUTO BUS COMPANY.—Along the line of Shanghai-Minghong-Nanwai Choling automobile road, there will be erected eleven bridges, construction work on which has been started. Land along the line for construction of the road is being purchased by the company. An order for several automobiles has been placed with Lee-woo & Company, a German firm, and two steam road rollers will be also purchased from the same firm, each costing about $3,000.

PROVINCIAL ROADS, KWANGSI.—The regulations governing road construction in Kwangsi provide for two important provincial roads from Yungning to Wuchow viâ Ping-yang, Kwai-hsien, Kwai-ping, Ping-nan and Tun-hsien and from Kwei-ling to Mong-kiang viâ Yang-soo, Lih-poo and Mong-shan. Mr. Mar Chuen-wu, civil governor of Kwangsi, has ordered Mr. Soo Chien, chief of public works department, to co-operate with the district magistrates and complete the former road in six months. Mr. Soo Woo-yar, chief of road construction department, is to have the latter, highway completed within the same period.

ANHWEI-CHEKIANG AUTOMOBILE ROAD.—Merchants of Anhwei and Chekiang have promoted an automobile transportation enterprise between Anhwei and Chekiang by building a modern road from Yu-hang, Chekiang, to Hweichow, Anhwei, with a capital of $1,600,000 to be partly raised by the promoters and partly by public subscription at $50 each share.

NEW ROAD, HARBIN.—The Harbin improvement work bureau, recently established to develop the port of Chu-er-ho, will construct a modern road at Fu-chiar-dien. The expenses involved will be drawn from land tax.

AUTO BUS SERVICE, NANTUNGCHOW.—An automobile transportation service has been inaugurated at King-sha-sze, near Nantungchow.

MOTOR CARS FOR HARBIN POST OFFICE.—The Chinese post office at Harbin is negotiating with the Oriental Automobile Transportation Company, a Russian organization at Dao-lee, Harbin, for hiring their motor cars to deliver mail.

AUTOMOBILE ROAD PROPOSED, KWANGSI.—With approval of Mr. Mar Chung-wu, civil governor of Kwangsi, the Chinese chamber of commerce at Pah-pu, in Wuhsien, Kwangsi, in co-operation with the Wuchow chamber, is planning to build an automobile road from Pah-pu to Wuchow, a distance of over 300 *li*, which is extimated to cost about $100,000.

CHANGSHAN-YUSHAN AUTOMOBILE ROAD.—The particulars of the automobile road from Chang-shan, Chekiang, to Yu-shan, Kiangsi. Proposed by Mr. Chen Shu-tang, are as follows: *Length*, eighty *li*; *Width*, twenty feet: *Road Bed*: a distance of 46 *li* calls for a fill of two to three feet; 14 *li*, a fill of 5-ft., and the remaining twenty *li* excavated to an average depth of four feet. The foundation will be covered by a layer of stone, on which six inches of gravel and two inches of surface coverings will be added. *Curves* to be limited to a radius of 50-ft. *Slope.* The road will have a slope of 45 degrees at both, sides which, however, may be altered if circumstances render if necessary when work is carried out. The slopes will be built of stones. *Ditches.* On each side of the road, a ditch of 10-ft. wide will be dug. *Bridges.* A reinforced concrete bridge of 210-ft. long with three arches will be constructed over King-sha-chee at Yu-shan. Besides, six 15-ft. reinforced concrete bridges and twenty 6-ft. stone bridges will be built on the whole line. *Sluices.* Many sluices with a limiting height of three feet will be built. *Stations.* Two stations and two sub-stations will be built and at Chung-chien-ling-der an automobile repairing works will be established. *Garages, etc.* Four garages containing twelve rooms, two warehouses containing twenty rooms and two gasolin storages containing four rooms will be built *Coolies' Rooms.* Forty coolies' rooms will be built at a distance of two *li* apart. *Passenger Cars.* Four passenger cars will be purchased. The vehicles are to have a gasoline efficiency of 40 *li* to the gallon; 30 h.p.; speed, 60 *li* per hour; weight, 2½ tons. *Freight Cars.* Fourteen freight cars will be purchased. They are to have a gasoline efficiency of 40 *li* to the gallon; 30 h.p.; speed, 40 *li* per hour; weight 2½ tons. *Road Rollers.* One 8-ton steam road roller and two 1-ton stone-rollers will be purchased. *Other Equipment.* Spades, shovels, carts, watercasks, weeps, etc., will be purchased.

AUTO BUS COMPANY, SHANSI.—The Tsing Pei or Northern Shansi Automobile Transportation Company is being organized at Taiyuanfu with a capital of $20,000.

AUTOMOBILE TRANSPORTATION COMPANY, HANKOW.—Mr. Wang Chi-liang is promoting an automobile transportation company at Hankow to operate a service on the outskirts of the city.

PROVINCIAL ROADS, CHEKIANG.—Construction of the main Chekiang provincial highway running through Wen-chow, Dan-chow, Hsiao-shun, etc., has been started. Another important road in the province has been surveyed by Mr. Chen Shu-tang. The proposed road will start from Hang-chow, and end at Yu-shan, Kiangsi, a distance of 592 *li*, and will call for an expenditure of about $4,000,000. Work on the most important section from Chang-shan to Yu-shan will be started at an estimated cost of $2,000,000.

ROAD CONSTRUCTION, CANTON.—A modern road 14,000-ft. in length and 100-ft. wide, will be constructed between Canton and Tsen-poo by the Canton road construction department at an estimated cost of $150,000.

Another modern road starting from Taikeng Road is also being built at a cost of over $100,000.

SERVICE FROM YUEN-CHEN TO TUNG-CHONG.—Mr. Pao of Tang-hsien, Shantung, has raised a capital of $100,000 for organizing an automobile transportation company to run a service with ten vehicles from Yue-chen to Tung-chong, a section on the newly-built American red cross road in Shantung.

NEW ROADS, SWATOW.—A plan for widening the principal streets of Swatow and building modern roads has been drawn up, and work on one road, to be about 40-ft. wide, has been started. The road-building scheme, in all probability, will make slow progress owing to shortage of funds. It is proposed to start work on a second road early in 1922.

AUTO BUS SERVICE CHIHLI.—The automobile transportation service from Kao-yang-hsien to Paotingfu, which was interrupted sometime ago has been resumed by the Yah Tung Automobile Transportation Company at Paotingfu, while the traffic on the whole line from Tientsin to Paotingfu will be inaugurated before long.

TEHCHOW-NANKUNG AUTO BUS SERVICE.—Local merchants are preparing to operate an autobus service on the road from Tehchow, Shantung, to Nankung, Chihli, built by the American red cross last year.

CHEKIANG-KIANGSI PROVINCIAL ROAD.—Mr. Chen Shu-tang, ex-director of Haining embankment work bureau, a road expert, has proposed the construction of a provincial road from Hangchow, Chekiang, to Yu-shan, Kiangsi, viâ Yue-hong, Fu-yang, Sing-tun, Tung-lu, Kien-teh, Lan-chee, Lung-yue, Ju-chow and Chang-shan, a distance of 592 *li*.

In the prospectus, Mr. Chen divides the line into eight sections, the one from Cheng-shan to Yu-shan to be built first. According to his estimate, the work will take eight years to complete, and calls for an expenditure of $4,000,000. A company will be organized to operate an autobus service on the road. When completed, the road will be owned and controlled by the company for thirty years, and at the expiration of the period, the property will be handed over to government. The proposals have been approved by the provincial authorities of Chekiang.

A NEW AUTO BUS SERVICE.—The Yah Tung Tientsin-Paoting Autobus Service Company, Tientsin, has been recently registered with the ministry of communication.

CHEKIANG-ANHWEI AUTO BUS SERVICE.—The Chekiang-Anhwei Autobus service Company, Ltd., will be established with a capital of $1,600,000 by Mr. Wu Di-ching, of Anhwei, in co-operation with several Chekiang merchants, to build an automobile road between Hangchow and Tun-chee, Anhwei, survey of the route is being carried on, and the company will have temporary office in Shanghai.

AUTO BUS SERVICE COMPANY EXTENDING LINE.—The Yen Foo Chien Automobile Transportation Company at Foochow is planning to extend the motor road from the south gate of the city to Hung-shan-jao, and survey of the prolonged line has been completed. The work is expected to start in April.

CHEFOO-WENHSIEN MOTOR ROAD.—While the ministry of communications is inviting reliable merchants to operate automobile service on the newly-built Chefoo-Wenhsien highway on franchise, the construction of stations by the ministry on behalf of motor service companies will be started. The Lungkow station will be established either at Ju-ching or 7 *li* away from Ju-ching. Mr. Tsai Chen-mow has been appointed to locate sites of other stations from Foo-chan to Boongwang.

CANTON-KOWLOON AUTO BUS SERVICE.—Autobus service was inaugurated on the Canton-Kowloon road on February 6, 1922.

SOOCHOW-KASHING-HUCHOW AUTOMOBILE ROAD.—An automobile road between Soochow, Kashing and Huchow and operate autobus service thereon is proceeding with remarkable activity. Many wealthy merchants of the places concerned have joined in investing in the enterprise. The company is to be capitalized at $5,000,000 and the roads built and operated will be (1) from Soochow to Pingfong, thence the road will diverge westernly to Huchow passing by Nanhsing and south-easterly to Kashing viâ Shen-shih, (2) from Soochow to Foo-shan-tseng viâ Changzo, (3) from Soochow to Tai-chong viâ Quanshan, connecting with the Shanghai-Taichong automobile road built by the Shanghai Taichong Autobus Service Company, Ltd., Shanghai, and (4) from Kashing to Choupu viâ Pinghu.